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to make the shoe

Pictured at right are three approaches to meeting the need for oil-resistant shoe soles. First (left) is a sole based on CHEMIGUM—first and finest of the nitrile rubbers. Second (center) is a sole based on a blend of CHEMIGUM and PLIOFLEX—general purpose styrene rubber—reinforced with PLIOLITE S-6B, a high styrene resin. And third (right) is a sole based on a popular "oil-resistant" rubber.

From these photographs and the accompanying data, it is evident that CHEMIGUM is the key to successfully combating the effects of oil and related products. CHEMIGUM alone offers the maximum in oil-resistance, without sacrifice of physical properties. CHEMIGUM plus PLIOFLEX and PLIOLITE S-6B offers a range of compounds to meet the most specific demands on costs or properties.

Extensive tests show that CHEMIGUM/PLIOFLEX/PLIOLITE shoe soles are markedly superior in *combined oil-resistance and wearing properties* to others compounded from individual rubbers or blends. They also exhibit excellent low temperature properties plus a low specific gravity for a lighter-weight sole *at a very attractive pound-volume cost.*

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Why not find out how easily and exactly CHEMIGUM or CHEMIGUM/PLIOFLEX/PLIOLITE blends can fit your need for shoe soles or any of the many products requiring resistance to oil. You can, simply by writing for details and the latest *Tech Book Bulletins* to: Goodyear, Chemical Division, Akron 16, Ohio.

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fit the need

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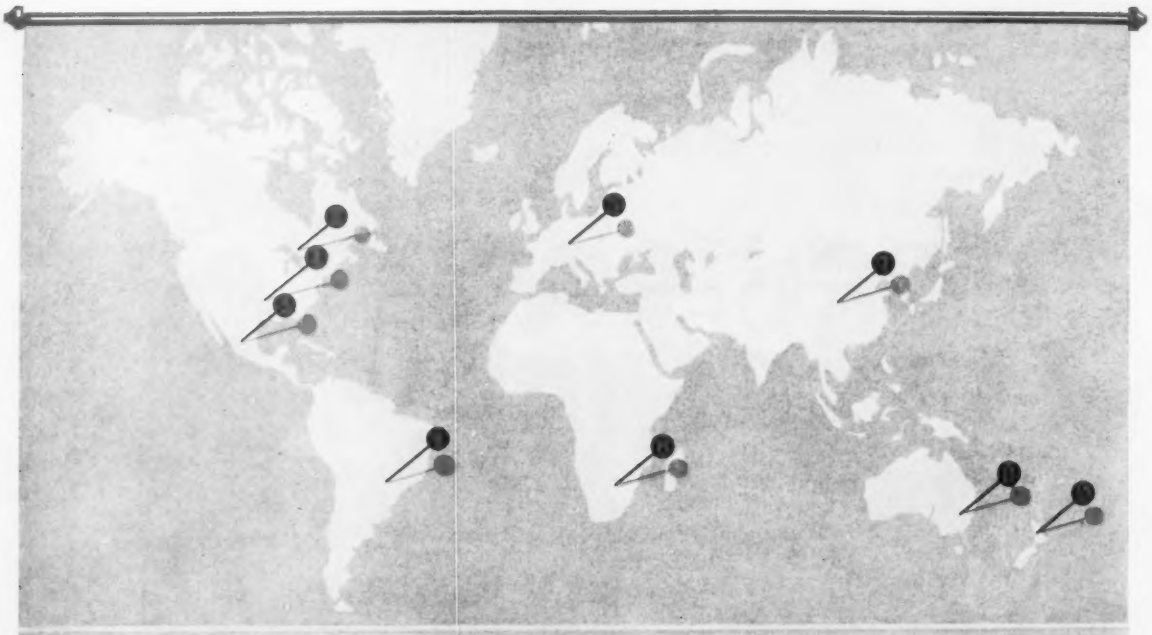
Hardness, Shore A	88	89	86
Abrasion Resistance Bureau of Standards, %	102.8	81.7	66.8
Ross Flex, Aged 24 Hours @ 212° F., Flexed Under ASTM #1 Oil, Flexes/Rating	64,300/10.0	125,000/6.5	125,000/7.5
Volume Swell, 7 Days @ RT + 70 Hours @ 158° F. in ASTM #3 Oil, %	3.7	35.2	66.9



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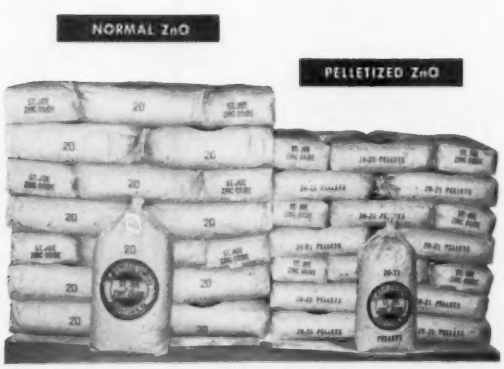

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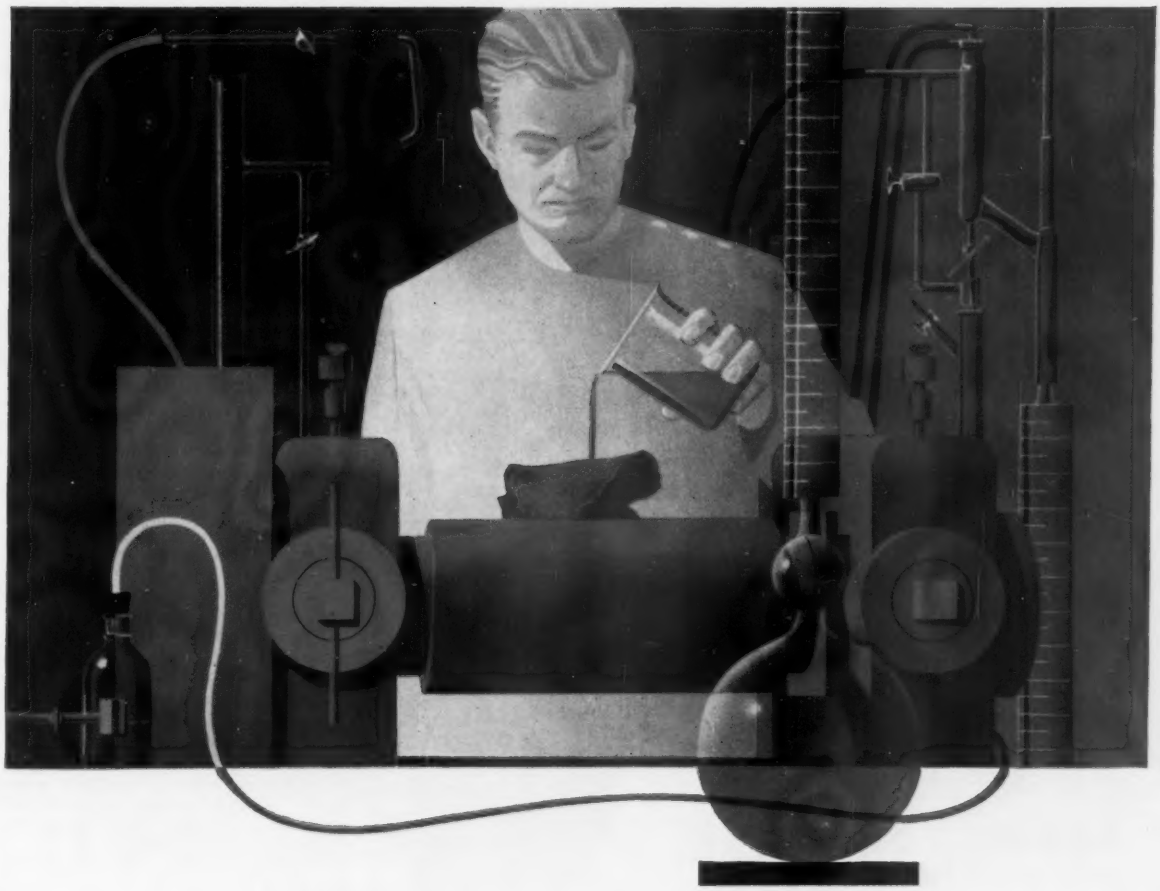

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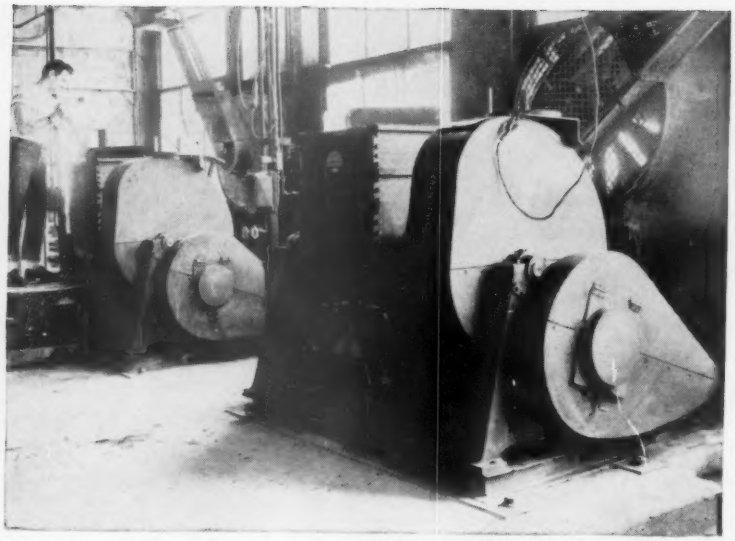

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Letters to the editor

Fixed Hourly Rates

Dear Sir:

We think you will be interested in learning that Wellco Shoe Corporation's switch from piece-work rates to fixed hourly rates in the cutting department has resulted in material savings equal to the entire labor cost in wages for that department.

The results of our three month test of this system proves that adopting generally accepted trade practices without detailed analysis as to the actual benefits that can be derived from that system, can often lead to costly errors and resultant loss in profits.

For years it has been an accepted theory in the footwear and other industries that the most equitable way to establish wage rates was on the basis of the number of units produced in an hour. The deceptive part of this system lies in its apparent logic; if a person produces more, you pay him more, if he produces less, you pay him less. But this method does not take into account a very vital cost factor—the actual cost of the materials being handled and the resultant loss through waste when the employee is primarily interested in speed of production rather than careful utilization of the materials being handled.

According to the actual figures kept during the three-month test period, when all employees in the cutting department were placed on a flat hourly wage equivalent to the highest average hourly earnings by the best man in the department, there was a drop of 10 percent average output because the cutters were operating more carefully in order to cut waste to a minimum. The more careful cutting operations, however, produced a 5 percent over-all saving in materials. Since the actual cash value of the materials handled by each cutter during an hour was a little more than 20 times the value of his hourly wage, it produced a net saving equivalent to 100 percent of the wages.

Inasmuch as our employees share in the profits of our company, they, too, will benefit from these savings, in addition to being paid far better wages than we would have been able to afford to pay them on the piece-work basis.

WALTER S. KAUFMAN
Wellco Shoe Corp.
Waynesville, N. C.

Tubeless versus Tubes

Dear Sir:

Although the subject of this letter may not exactly be concerned with the field your good magazine covers, your "Letters to the Editor" column seems to offer the only forum available to discuss rubber matters; hence my writing you.

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rubber industry for a good many years, I have a natural instinct to defend the industry against any seeming attack, and, as a result, I have been doing a considerable amount of defending and explaining to my friends on the subject of tubeless tires. But I must admit that the great weight of evidence seems to be on the side of those who insist that the best cure for a tubeless tire is a tube!

In the course of my travels I have been told over and over again by garagemen, policemen, other salesmen and friends that tubeless tires are simply no good. They failed to hold air; they collapsed on sharp turns by police cars; they could not be repaired by the average garage; rust or sand on the rim caused air to leak; any rough handling of the car (and have you had your car in a public garage lately?) that resulted in a blow to the tire wall would cause it to collapse. These are the substance of the complaints.

As I said, I instinctively defended against them, but now that I've had several of these things happen to me I wonder whether the tire boys haven't let themselves go overboard on a principle that fails to measure up in practice. I've had it where tubeless tires are concerned—mine now have tubes in them, because my own experience has been that tubeless tires are not dependable.

It seems to me time that the tire design boys took another look at their pet theory and began to do something about the practical problems their customers are having. I'm sure that a good many of your readers have had the same experience I've had and you could be doing the tire people a favor by bringing it to their attention.

NAME WITHHELD

Proper Credit

Dear Sir:

Your editorial in the June RUBBER AGE, commenting so favorably on the April 30 Report of the President to the Congress on the Nation's Rubber Requirements and Resources, has of course not escaped my attention.

The first paragraph of your editorial gives the report a very high rating and commends the Ad Hoc Committee for its broad grasp of the rubber situation. As a member of the Committee, I would like to register my gratitude for the recognition given and for the praise.

With regard to my personal contribution, I prayed earnestly for guidance; if the result is good, I want to acknowledge that "Thine is the Power and the Glory".

E. G. HOLT
Department of Commerce
Washington 25, D. C.

Memo from the Editor

The "Letters to the Editor" columns were recently inaugurated. They are open to all of our readers and we invite you to send along your comments for publication. These comments may be specifically applied to published articles and news items or may reflect your own views on any facet of the rubber industry. We reserve the right to edit all material. Address: Editor, RUBBER AGE, 101 West 31st St., New York 1, N. Y.

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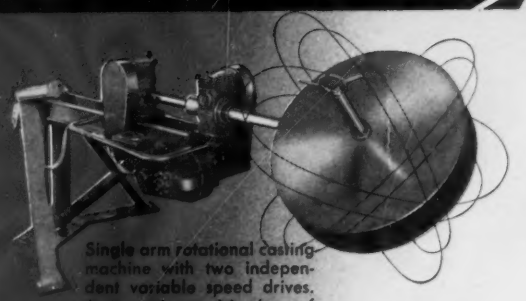
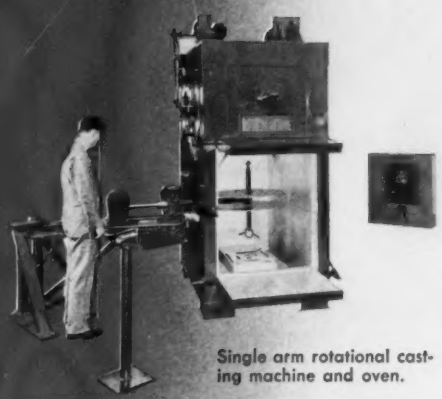
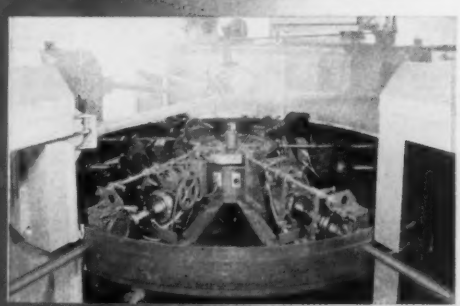


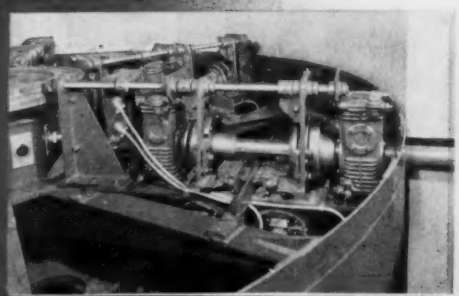
Single arm rotational casting machine with two independent variable speed drives. Automatic positioning of mold wheel for convenient mold servicing.



Single arm rotational casting machine and oven.



Multiple arm casting machine showing separate drive, clutches and brakes for mold rotation in each of the two planes. Designed for precise stopping necessary with automatic mold opening and closing.



Turntable style with six arms. An additional six arms can be added for a total of 12.

Significant Advance for Plastic Production

Machines engineered and built to your specific requirement. Following are some of the features built in our SPECIAL MACHINES.

Two groups of molds per arm, arranged for simultaneous rotation around two axes perpendicular with each other.

Two separate and variable speed drives rotate the molds around each axis. This action controls wall thickness for different product shapes.

Movement of arms is indexed for stop and go—not a continuous movement. Stopping time in oven or at the mold's service position can be varied.

Rotation of molds can be automatically stopped or started at service position and oven entrance.

Molds are automatically positioned for convenient opening, stripping, filling and closing.

A 30-inch diameter mold area allows a large range of mold sizes and flexibility of arrangement.

Arms, oven units and service stations can be added to increase capacity and mold servicing.

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HALE and KULLGREN, INC.

P. O. Box 1231 · AKRON, OHIO

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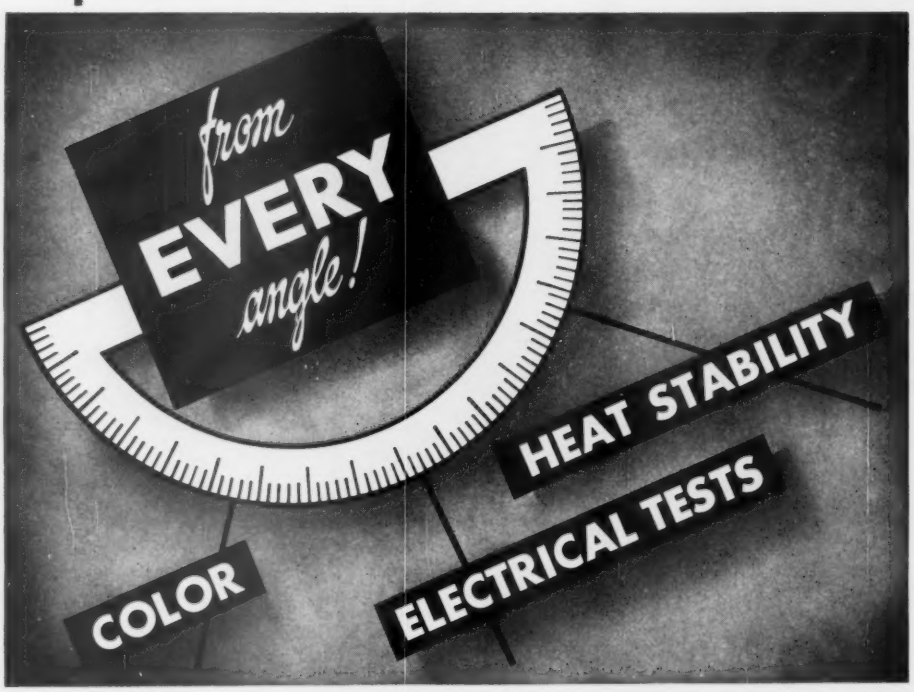

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for Compounding

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Dixie 50 is a must for black extruded mechanicals. Its use in molded goods is extensive. It is preferred for sub-treads and carcass stocks, and in some grades of tread rubber (camelback).

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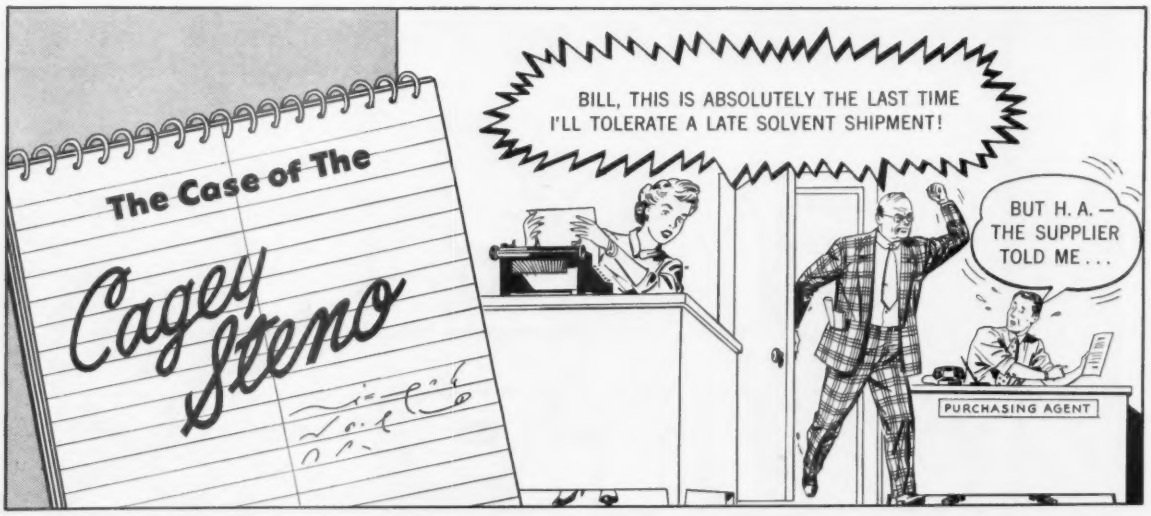
The Case of The
Cagey Steno
BILL, THIS IS ABSOLUTELY THE LAST TIME I'LL TOLERATE A LATE SOLVENT SHIPMENT!
BUT H. A. — THE SUPPLIER TOLD ME . . .
PURCHASING AGENT

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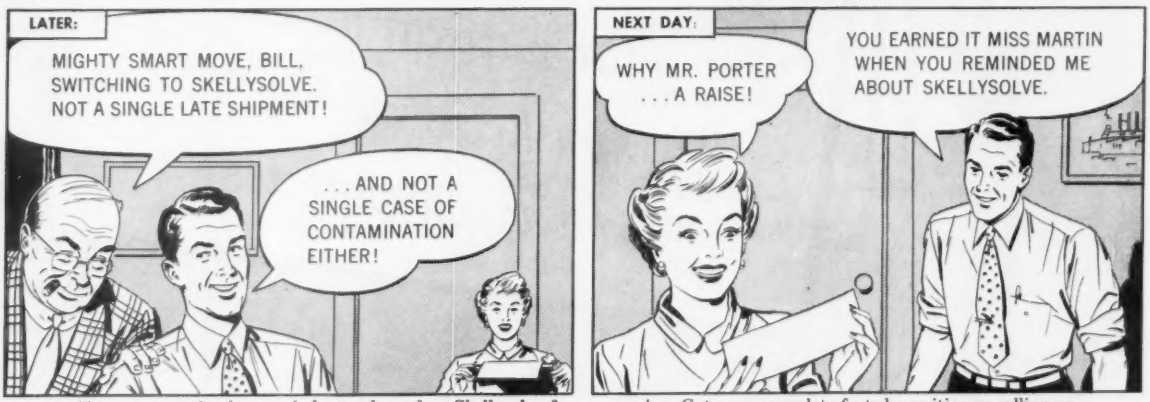
O.K., SHIP US OUR FIRST ORDER!


LATER:
MIGHTY SMART MOVE, BILL, SWITCHING TO SKELLYSOLVE. NOT A SINGLE LATE SHIPMENT!
. . . AND NOT A SINGLE CASE OF CONTAMINATION EITHER!
NEXT DAY:
WHY MR. PORTER . . . A RAISE!
YOU EARNED IT MISS MARTIN WHEN YOU REMINDED ME ABOUT SKELLYSOLVE.

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SKELLYSOLVE-B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound. Closed cup flash point about -25°F.

SKELLYSOLVE-C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve-B. Closed cup flash point about 13°F.

SKELLYSOLVE-H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve-C is desired. Closed cup flash point about -16°F.

SKELLYSOLVE-L. For general manufacturing operations where a medium evaporation rate is required. Closed cup flash point about 12°F.

SKELLYSOLVE-R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency. Closed cup flash point about -25°F.

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SKELLY Skellysolve

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Industrial Division
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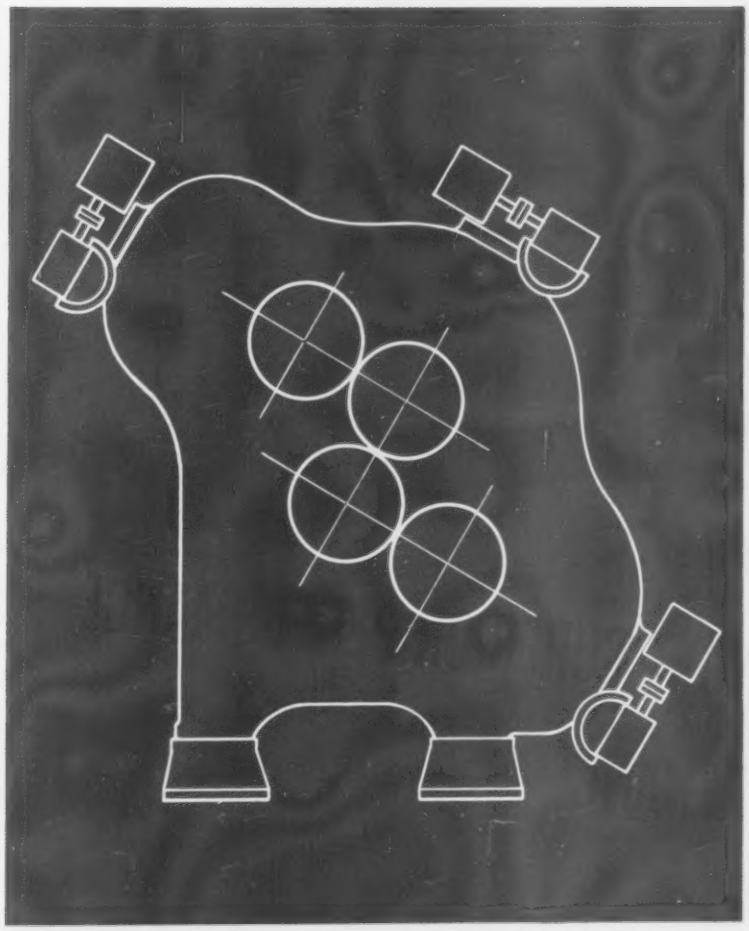
NEW F-B inclined "Z" calender provides better accessibility for operation



Still another outstanding contribution to the efficient conversion of raw material to finished product is the Farrel-Birmingham four-roll *inclined "Z" calender*. It provides improved operating conditions while retaining the many recognized advantages of the original F-B "Z" calender design.

The angle of the rolls makes threading easier and facilitates access to the rolls for operation and for installation of auxiliary equipment.

Other advantages of this new calender include: (1) "Z" arrangement of the rolls isolates the separating forces. With only two rolls in any single plane, there is no pressure from a third roll to affect roll settings and cause fluctuations in gauge. (2) Motorized crossed axes device (single or double) provides widest range of "crown" adjustment with maximum accuracy of gauge. (3) Hydraulic pre-loading devices anchor rolls in their fixed loaded positions in precision bearings.

Before you decide on a calender, come to "Calender Headquarters," where the "Z" calender was originated and developed. In the meantime ask for details of the new F-B inclined "Z" calender.

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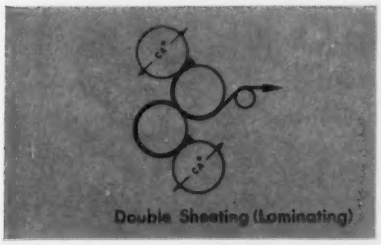
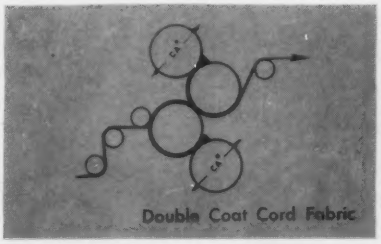
ANSONIA, CONNECTICUT

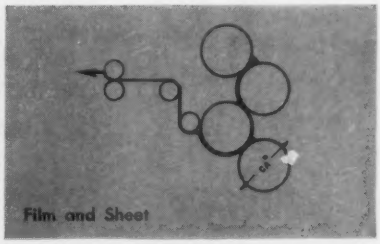
Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Fayetteville (N.C.), Los Angeles, Houston



Double Sheeting (Laminating)



Double Coat Cord Fabric



Film and Sheet

*CA=Crossed Axes

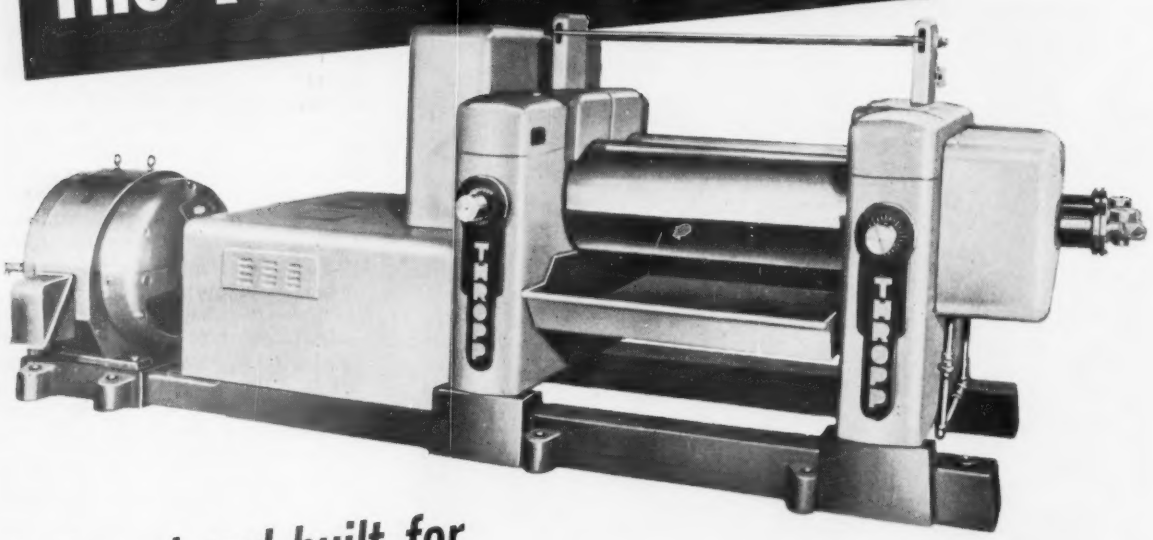
Four inclined "Z" calenders as shown in these diagrams are now being built by Farrel-Birmingham for the applications noted. One calender has separate motor drive to each roll.

Farrel-Birmingham®

FB-1074

F-B PRODUCTION UNITS—Banbury Mixers • Plasticators • Pelletizers • Extruders • Calenders • Mixing, Grinding, Warming and Sheeting Mills • Refiners • Crackers • Washers • Hose Machines • Bale Cutters • Hydraulic Presses • Injection Molding Machines • and other equipment for processing rubber and plastics materials.

The THROPP 60″ MILL



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This extra heavy duty 60″ streamlined mill is designed and built in every detail to provide dependable uninterrupted production under the rigorous service conditions encountered in the Rubber and Plastics Industries.

Built-in herringbone gear speed reducers, with anti-friction roller bearings, insure proper alignment with master gear and pinion at all times. Fully enclosed frames and guards keep cleaning and maintenance costs down.

Thropp 42″, 50″, 72″ and 84″ mills for the Rubber and Plastics Industries are also available.

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This comprehensive 8-page technical bulletin on National Adipic Acid gives physical and chemical properties; principal reactions of the carboxyl and alpha methylene groups; solubility curve, and suggested uses with copious literature references.

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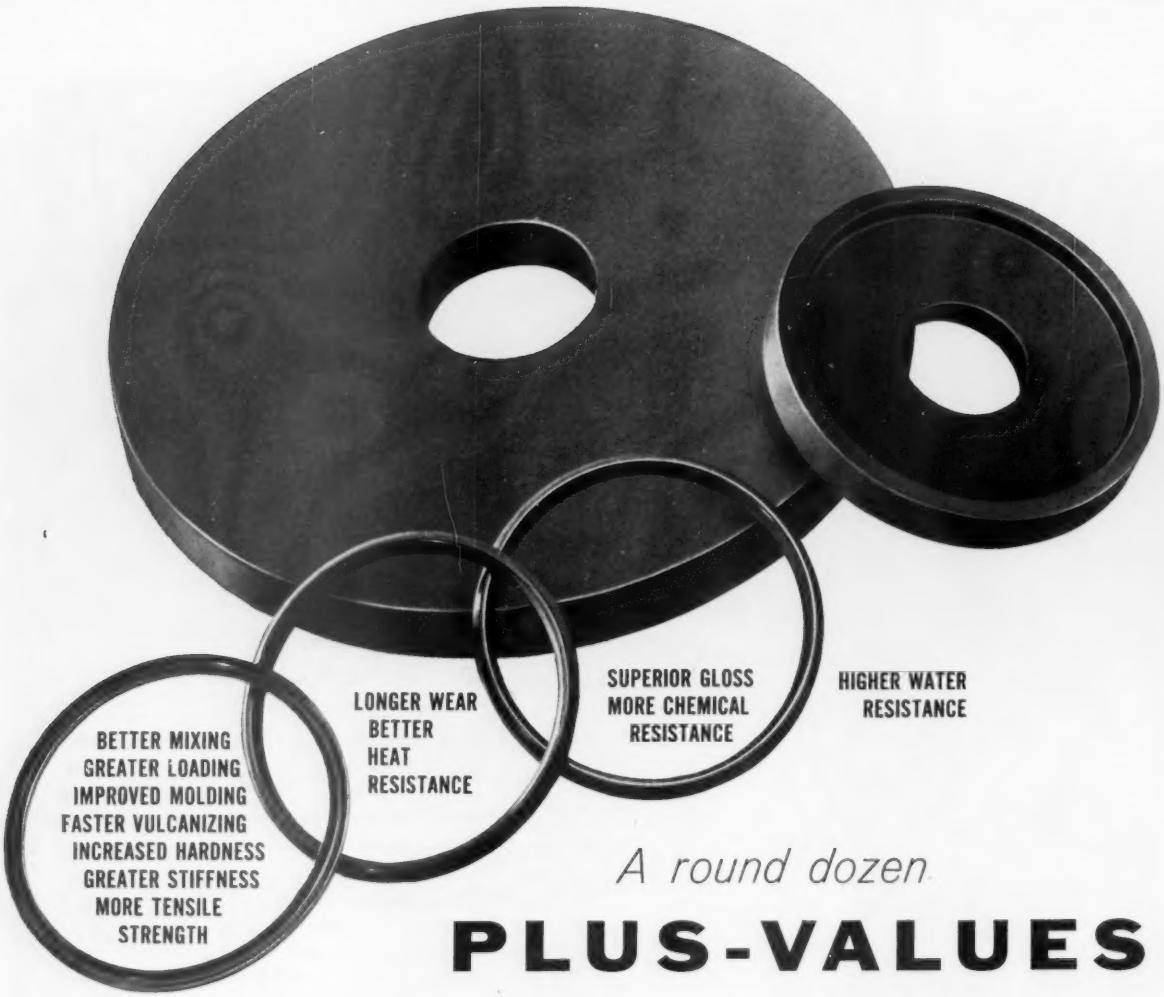

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PLUS-VALUES

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● Discover the impressive effects Durez phenolic resins can have on your operations . . . in improved processing, in enhanced end-product properties.

For example, we list above the benefits being obtained with a group of these resins developed for incorporation with Buna N's. The resins are completely compatible with synthetic rubber of this type and serve as plasticizers at processing temperatures. Owing to chemical reactivity, they contribute strongly to vulcanization, reinforcement, hardness, stiffness, abrasion resistance, and other characteristics desired in hard and semi-hard Buna N stocks.

Other Durez phenolic resins are recommended for specific advantages . . . with GRS in shoe sole and heel stocks, with natural rubber and Neoprene molding compounds, and in both air-dry and thermosetting adhesives.

Our experience as pioneers in perfecting resins for the rubber industry is at your service. For more information on how they can help to solve specific problems, write, giving details please.

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Phenolic Plastics for the Rubber Industry

DUREZ PLASTICS DIVISION

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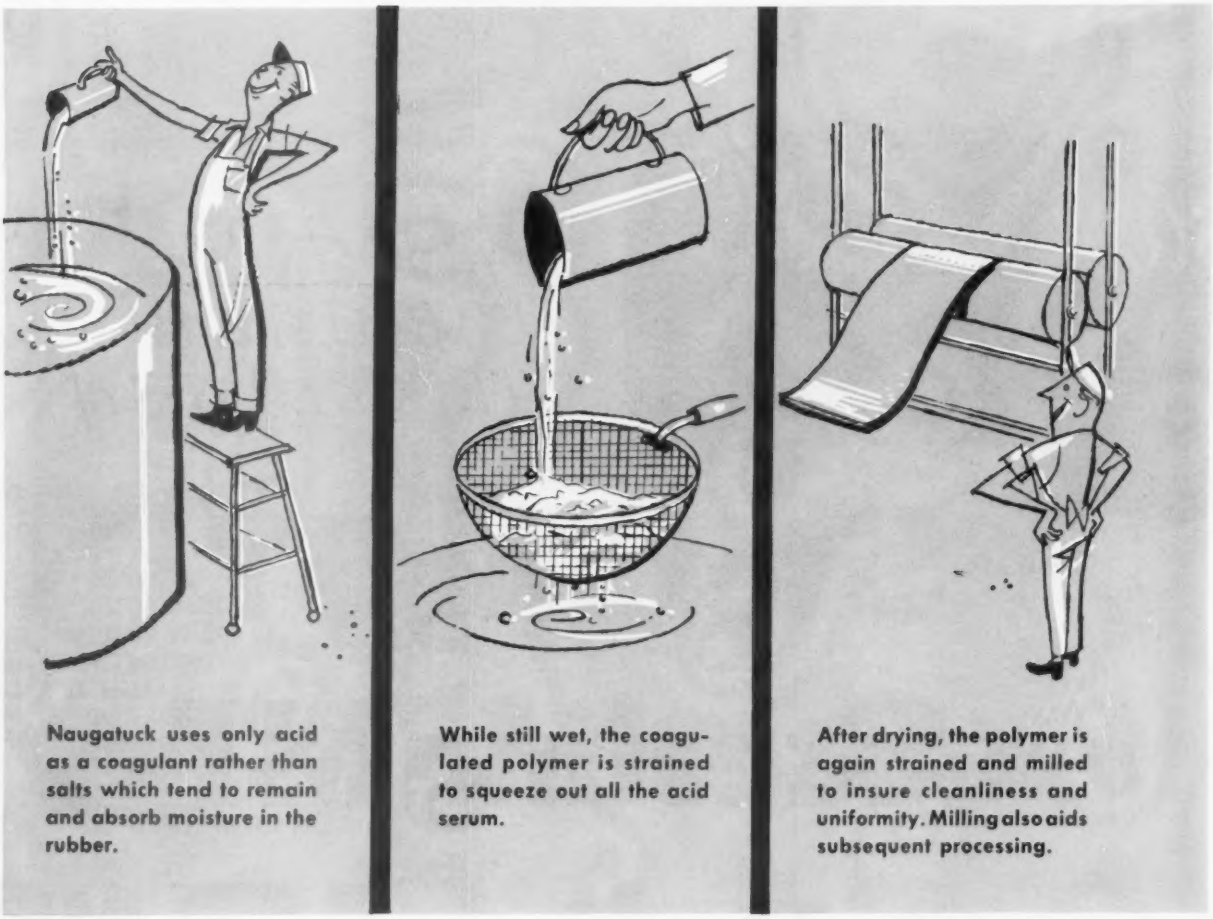
NAUGATUCK NAUGAPOL POLYMERS



Naugatuck uses only acid as a coagulant rather than salts which tend to remain and absorb moisture in the rubber.

While still wet, the coagulated polymer is strained to squeeze out all the acid serum.

After drying, the polymer is again strained and milled to insure cleanliness and uniformity. Milling also aids subsequent processing.

Specially Processed for Low Moisture Absorption

MADE to be *different!* That's the story of Naugatuck's premium grades of GR-S rubber known now as NAUGAPOLS*. Naugatuck's *special processing* during transformation from the liquid copolymer state produces elastomers characterized by:

- **VERY LOW MOISTURE ABSORPTION**
- **HIGH DIELECTRIC PROPERTIES**
- **EXTREME CLEANLINESS AND UNIFORMITY**
- **LOW ASH CONTENT**
- **EASE OF SUBSEQUENT PROCESSING**

As a result, NAUGAPOLS are especially suitable for use in *wire and cable insulation, pressure-sensitive adhesives, and mechanical rubber products requiring good flexibility at sub-freezing temperatures.*

A stabilizer or antioxidant is added to each NAUGAPOL prior to flocculation to protect it against oxygen deterioration and heat degradation during manufacture, storage and later processing. A crosslinking agent has also been added to NAUGAPOL 1018 to give it optimum processing properties while retaining its excellent dielectric and low moisture-absorption characteristics.

Contact your nearest Naugatuck representative for further details and current availability of these premium-grade GR-S elastomers.

*Naugatuck's trade name for its specially-processed butadiene-styrene copolymers.

CURRENT NAUGAPOL POLYMERS

Hot Types

TYPE	Bound Styrene	Mooney Viscosity	Stabilizer	End Use
NAUGAPOL 1016	23.5%	50	B-L-E (staining)	Wire and cable insulation and mechanical goods.
NAUGAPOL 1018	23.5%†	—	POLYGARD (non-staining)	Wire and cable insulation and mechanical goods. (Crosslinked processing aid).
NAUGAPOL 1019	23.5%	50	POLYGARD (non-staining)	Wire and cable insulation and mechanical goods.
NAUGAPOL 1021	46%	90	P.B.N.A. (staining)	Adhesives and sealants.
NAUGAPOL 1022	23.5%	77	POLYGARD (non-staining)	Adhesives and pressure-sensitive tape.
NAUGAPOL 1023	13%	50	B-L-E (staining)	Wire and cable insulation and mechanical goods for low-temperature service.

Cold Types

NAUGAPOL 1503	23.5%	52	POLYGARD (non-staining)	Wire and cable insulation and mechanical goods.
NAUGAPOL 1504	12%	52	POLYGARD (non-staining)	Wire and cable insulation and mechanical goods for low-temperature service.

†Including a crosslinking agent

Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

US RUBBER

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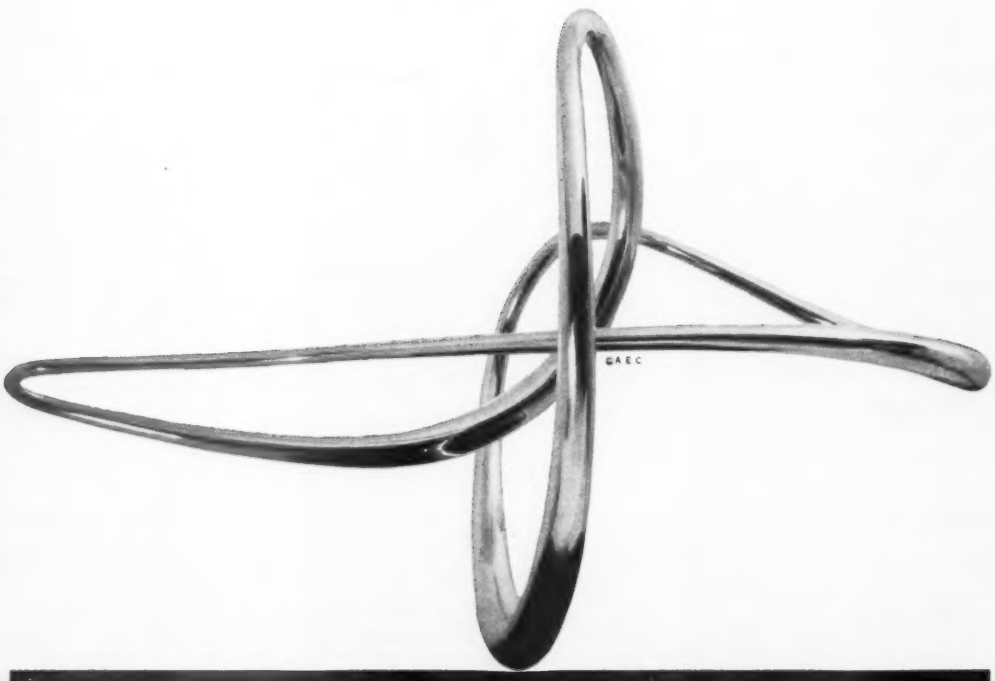
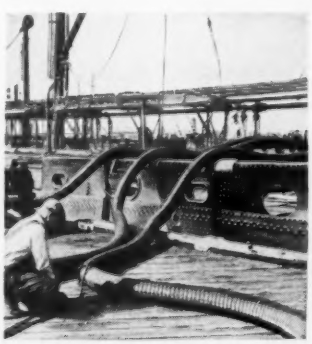


Sculpture by Jose de Rivera—symbol of American Enka Corporation, one of America's great producers of synthetic fibers.

Performance depends above all upon quality and planning. It is vitally important to the user to know that Enka has developed its product with his specific end use in mind from the very beginning. That is why Enka yarns consistently deliver satisfactory performance in action.

Manufacturers of industrial hose know they can rely on Enka high tenacity rayon to give their products the ***strength and durability*** they require. And, from the standpoint of economy, Enka high tenacity rayon offers these advantages at ***lower cost.*** Think what this can mean in your business and call American Enka today.



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NEOPRENE TYPE WX

AS CRYSTALLIZATION-RESISTANT AS TYPE GN

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AS STABLE AND EASY TO PROCESS AS TYPE W

Neoprene Type WX products have the desirable properties of Neoprene Type W vulcanizates. For the best crystallization resistance Neoprene Type WRT is recommended. For many products Neoprene Type WX is adequate and more economical.

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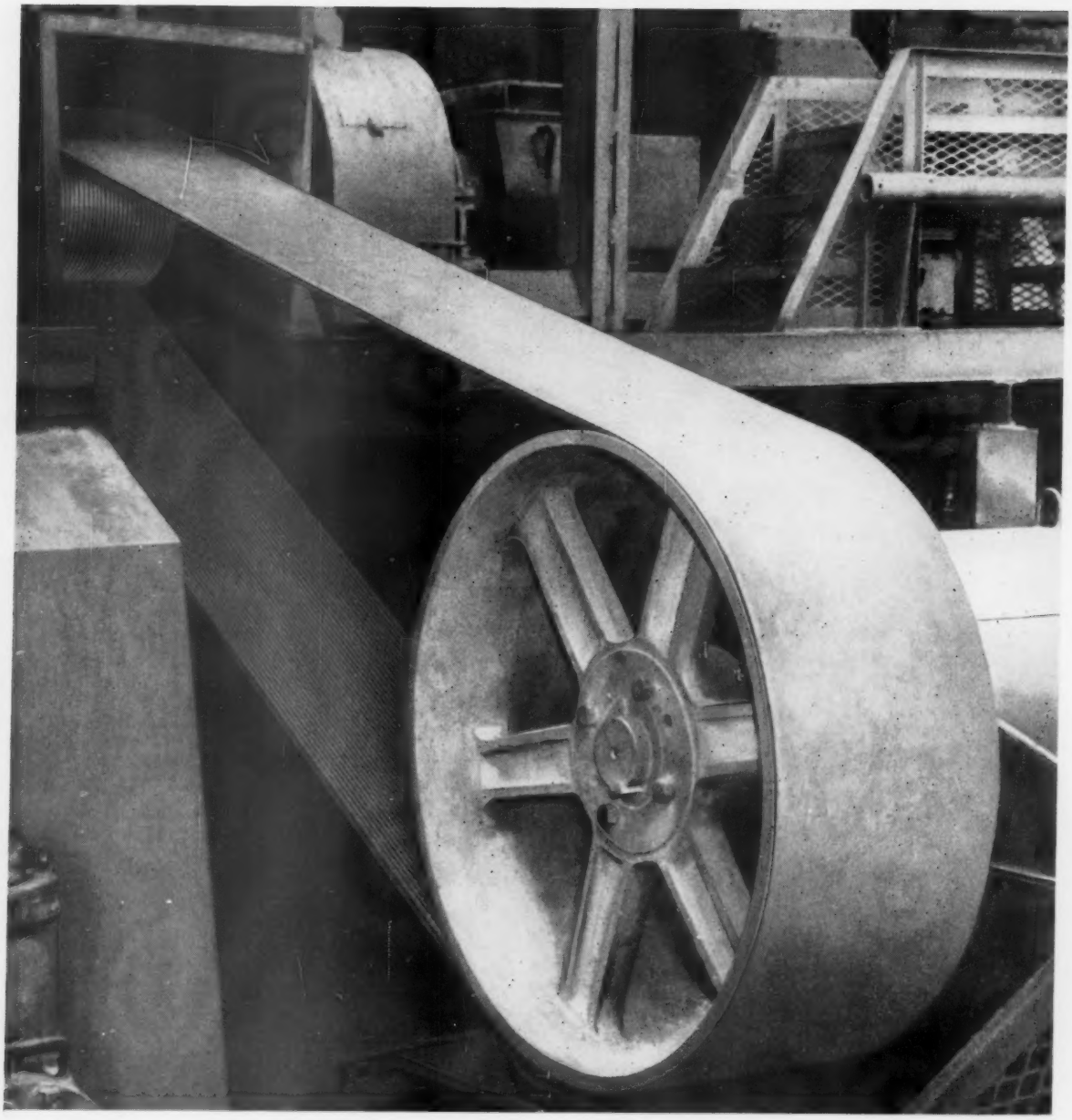

A GRIPPING SITUATION – This unique, multi-ribbed Poly-V® Belt drives a 900 HP oil field pump for a West Texas drilling rig. Manufactured by Raybestos-Manhattan, Inc., its single-unit construction eliminates "matching" problems; provides excellent grip and positive tracking wherever heavy-duty power transmission is required. Because great lateral strength, crack-resistance and body are required in its manufacturing, Raybestos-Manhattan turned to Mount Vernon Mills, Inc. for a top cover fabric.

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Cabot produces the nontoxic plasticizer Cabflex Di-BA® and does not make the finished film.

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* Nontoxic means "suitable" for use in food packaging materials.

"Suitability means that under the conditions of use, and in the amounts now employed to produce a finished film, di-iso-butyl adipate has such a low order of solubility as to be insignificant as a food contaminant when weighed in the light of the toxicological evidence."

". . this plasticizer has had adequate pharmacological study demonstrating its harmlessness in the amounts now used in finished commercial films . ."

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For product data sheets, further technical information and for samples, address

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3848-A

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Sales are lost, product acceptance damaged, when ozone cracking shows up even on new products.

You can give your product dependable protection from ozone cracking, from the day it's made till the day it's discarded even under the most extreme conditions, with Universal's high potency rubber antiozidants, UOP 288 and UOP 88.

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To be sure your product presents the quality appearance you built into it, when it comes face to face with a potential customer, let us recommend the correct UOP antiozidant formulation to give it complete protection from ozone cracking.

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30 ALGONQUIN ROAD
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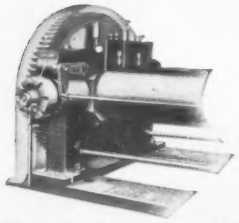
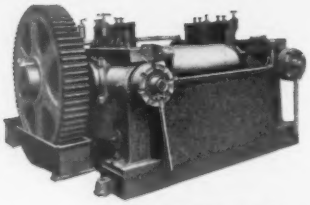


Machine-cut driving gears and roll-end pinions machine moulded. Bearings are full-circle special gunmetal. Vernier adjustment with safety breaking discs.

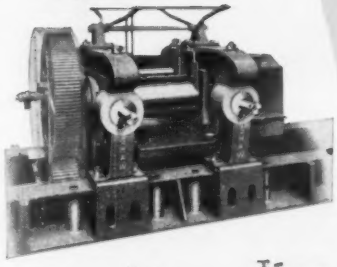
a line-up of sound construction

All mills are built to the Lunn Safety principle. The guards can be altered, within limits, to suit customers operating conditions.



This is a typical lay-out of a SHAW all steel Cracker and Mixing and/or Warming Mills in line. SHAW is typical of the best in plant for the rubber industry. Here is massive construction with fine adjustment; continuous — powerful — operation with absolute safety for the operator.

Immensely strong construction for a long life under continuous production is typified by this 36″ x 21″ x 26″ Heavy Duty Single Geared Refiner. Note the continuous girder type bedplate for perfect stability and alignment when a number of machines are used in series with undershaft drive.



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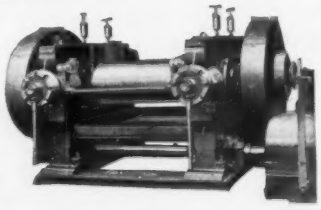
Presses etc.

A typical double geared two speed machine for mixing and sheeting.



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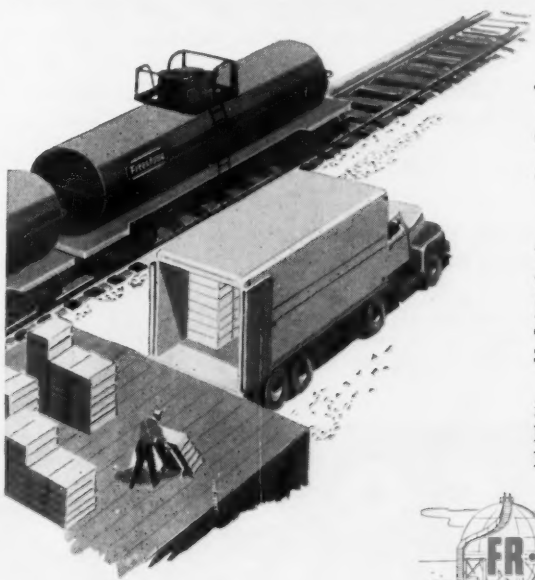

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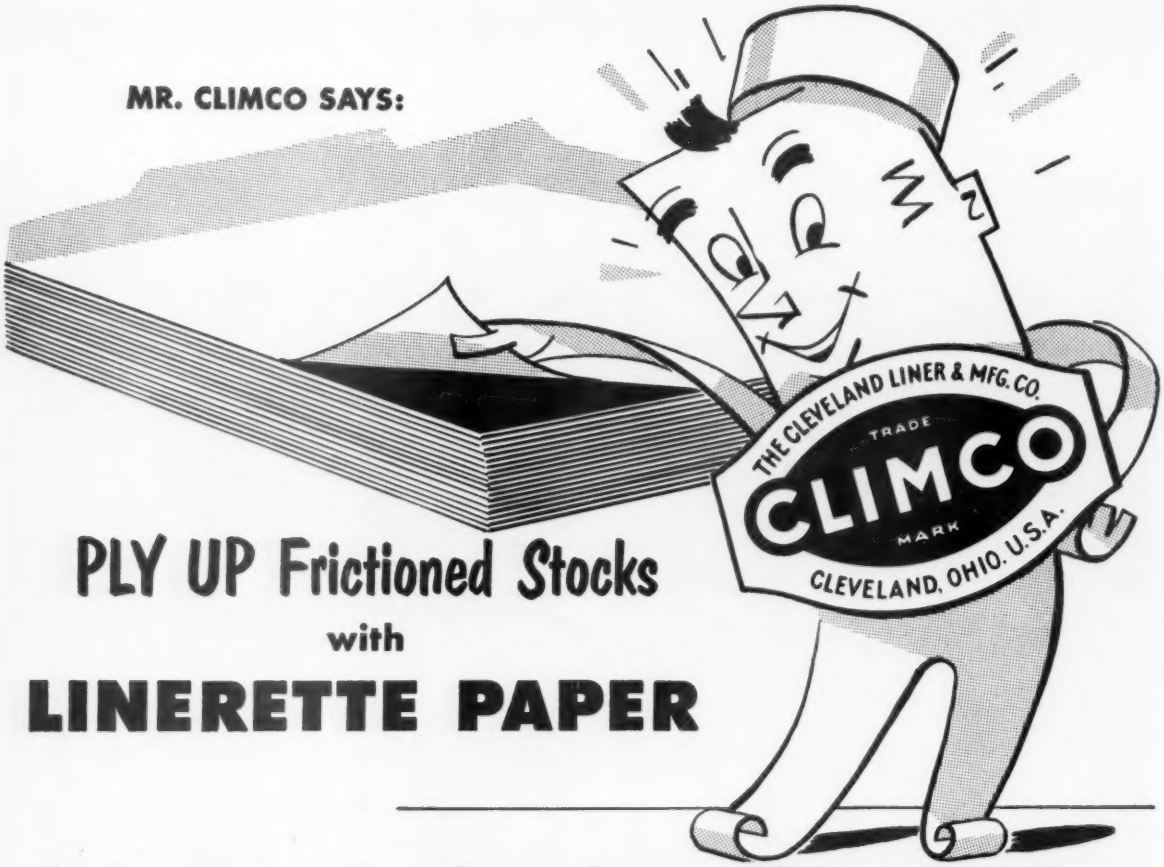

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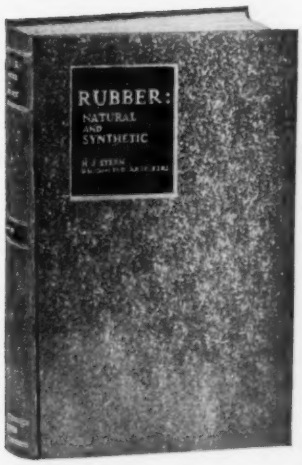

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Dr. Stern has been engaged as a chemist in the rubber industry for more than 25 years and since 1935 has practiced successfully in London as a Consultant. He is the author of "Practical Latex Work" and of many publications concerned with the scientific and technological aspects of natural and synthetic rubber.

SUMMARY OF CONTENTS BY CHAPTERS

Part I

1. **Historical Introduction; Mastication; Vulcanization.**
2. **Plantation Rubber.**
3. **Natural Rubber: Composition, Reactions, Derivatives.**
4. **Properties of Vulcanized Rubber.**
5. **Compounding Ingredients.**
6. **Rubber Machinery; Solvents and Solutions; Reclaiming.**
7. **Latex.**

Part II

8. **Synthetic Rubber (History and Development).**
9. **Manufacture and Technology of Synthetic Rubbers.**
10. **Synthetic Rubber Latices.**
11. **Synthetic Resins; Plastics.**
12. **Manufacturing Processes (of various rubber products).**
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Sources of Further Information; Metric Equivalents; Subject Index.

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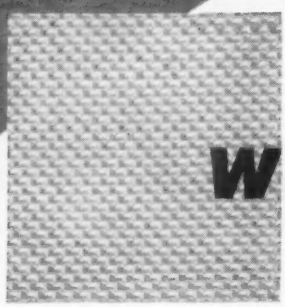

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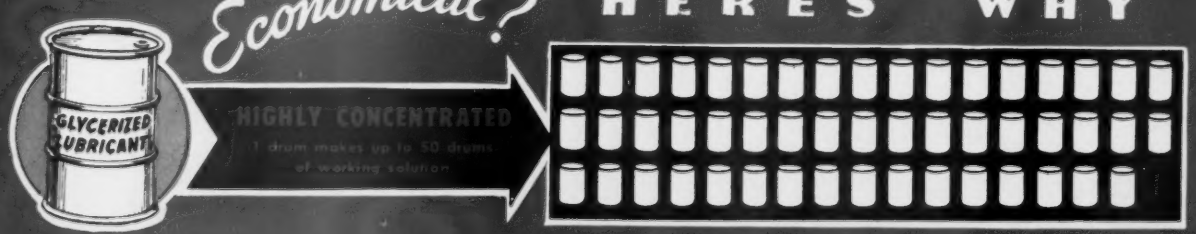

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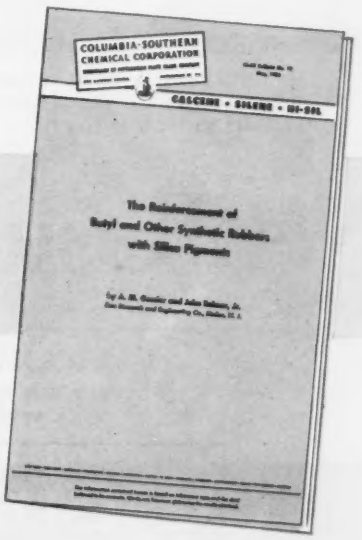

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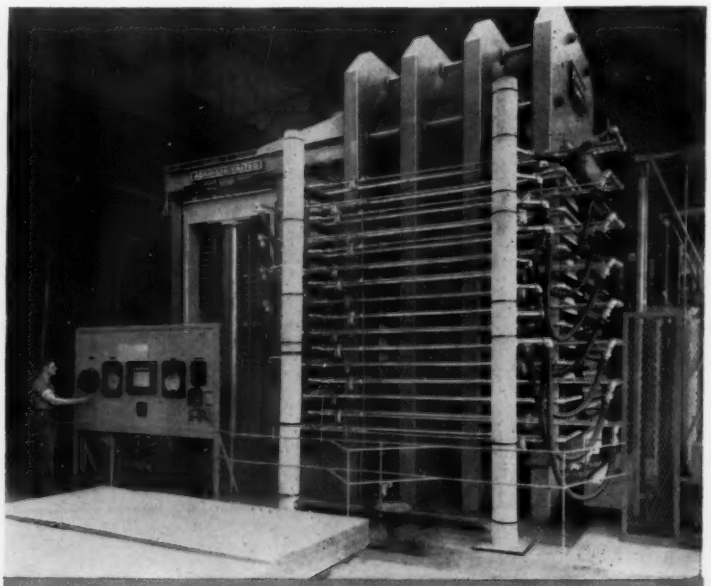

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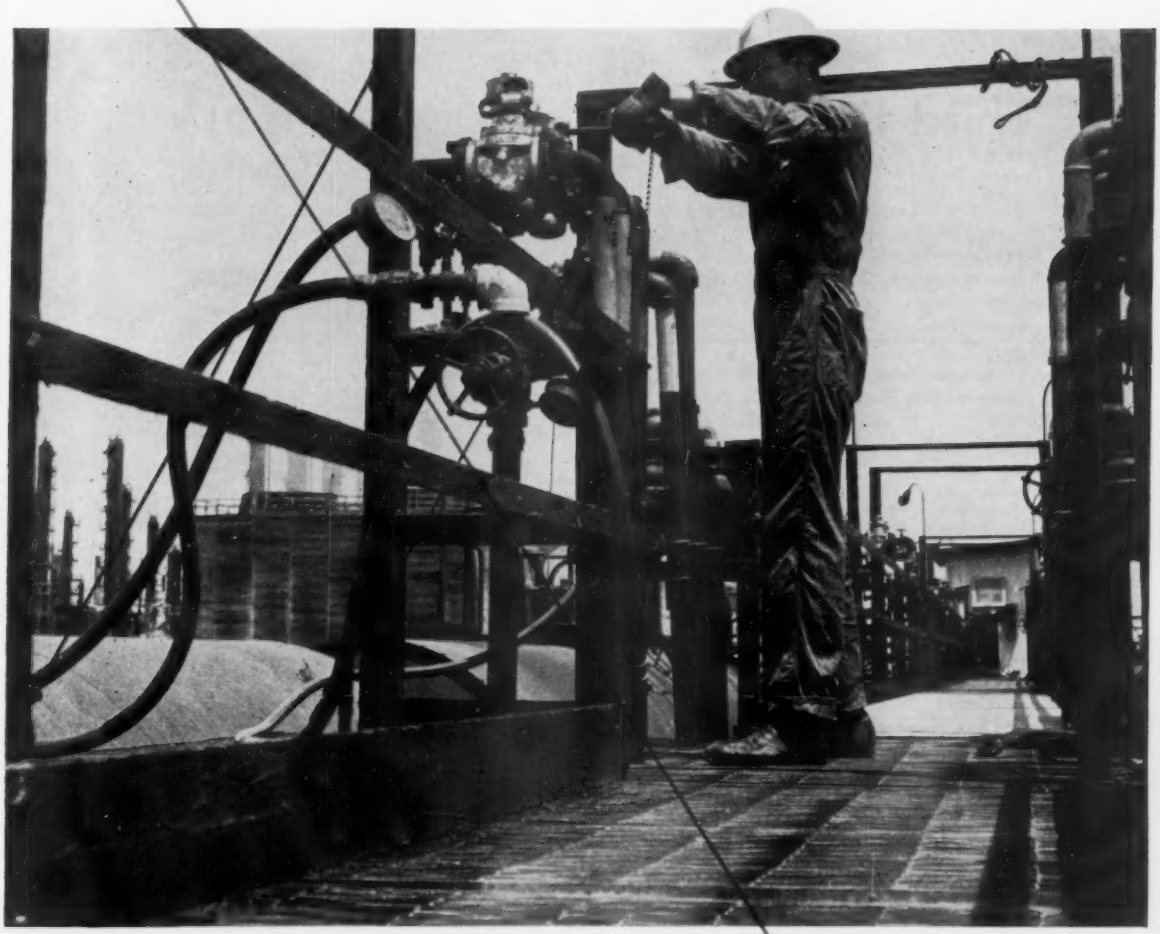

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Contribution to the Study of Mineral Elements in Field Latex. *E. R. Beaufils.*

Rubber Peptized on the Plantation. *G. Giger, J. Lemee* and *M. Liponski.*

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Structure and Solution Properties of High Molecular Weight Butadiene-Styrene Copolymers. *R. B. MacFarlane* and *L. A. McLeod.*

Pyridinium High Polymers—A New Class of Oil-Resistant Synthetic Rubbers. *W. B. Reynolds, J. E. Pritchard, M. H. Opheim,* and *G. Kraus.*

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Chemical Reactions of Antioxidants Used in Vulcanized Rubber. *P. Schneider.*

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Study of Rubberlike Polymers by Nuclear Magnetism. *B. A. Mrowca* and *E. Guth.*

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Theoretical Model for the Elastic Behavior of Filler-Reinforced Vulcanized Rubbers. *L. Mullins* and *N. R. Tobin.*

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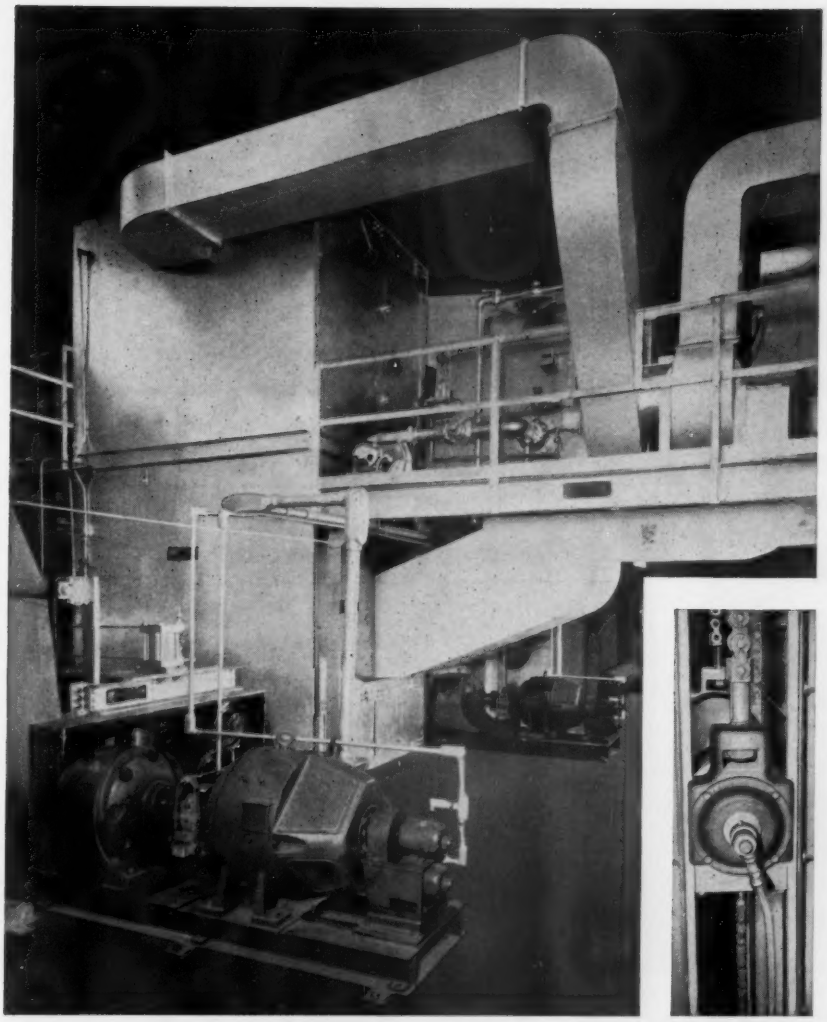

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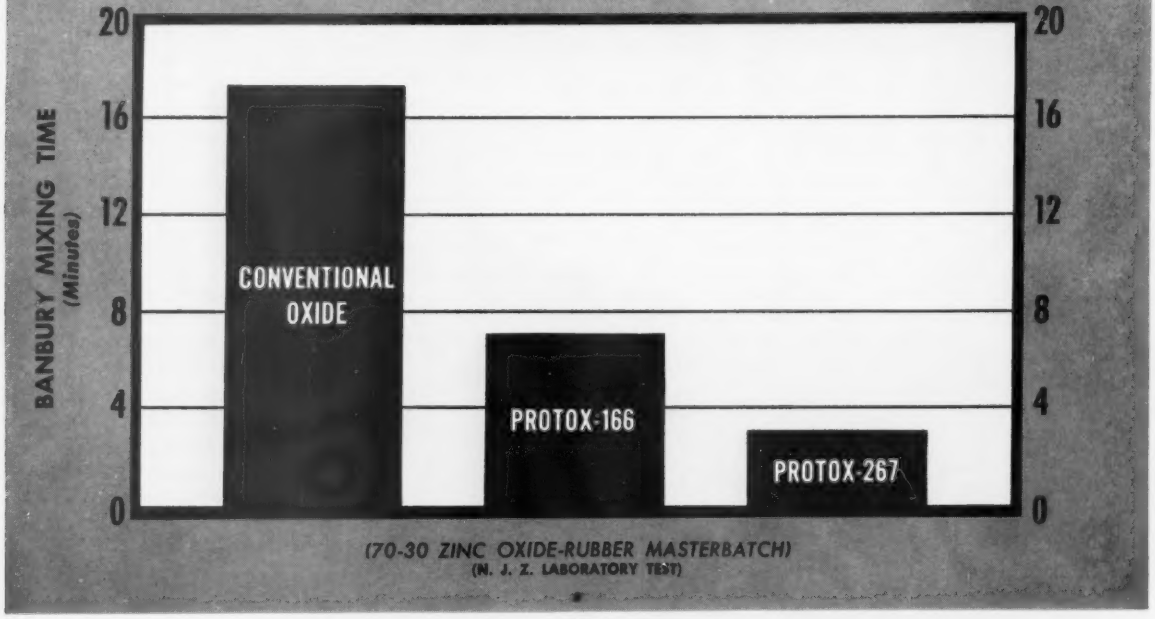

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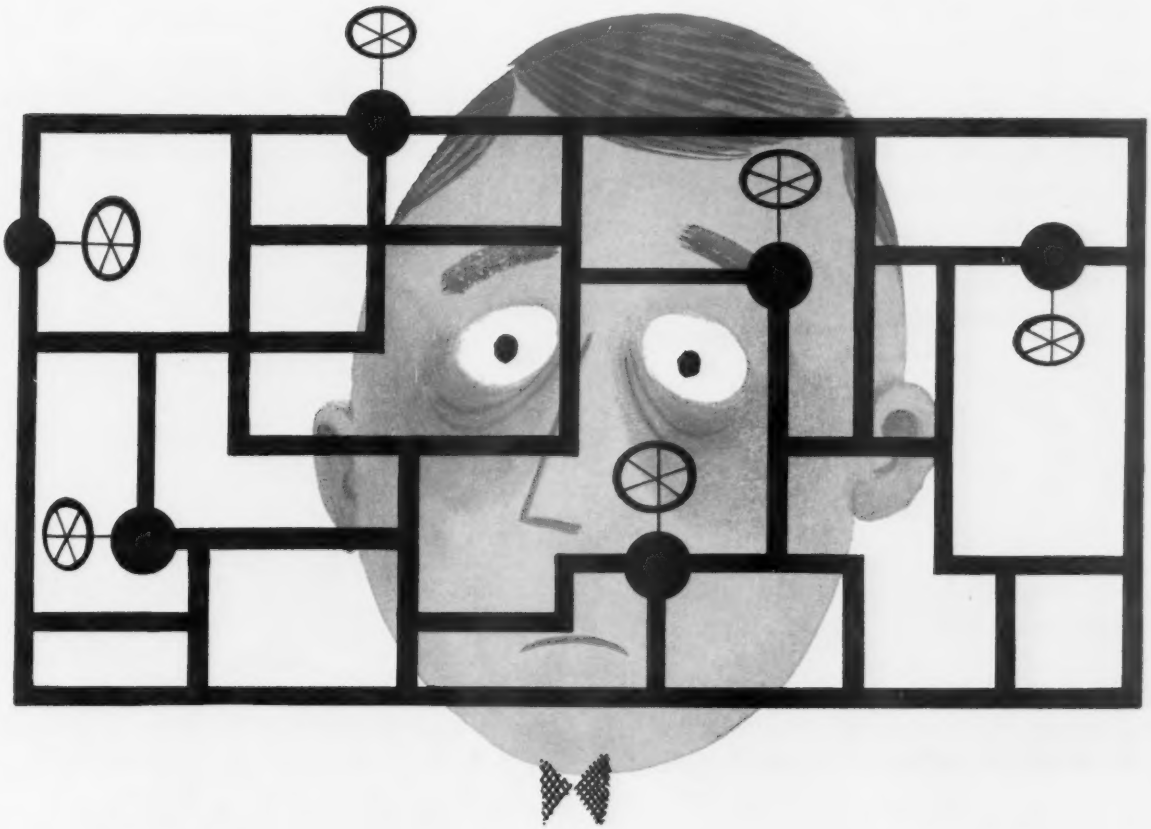

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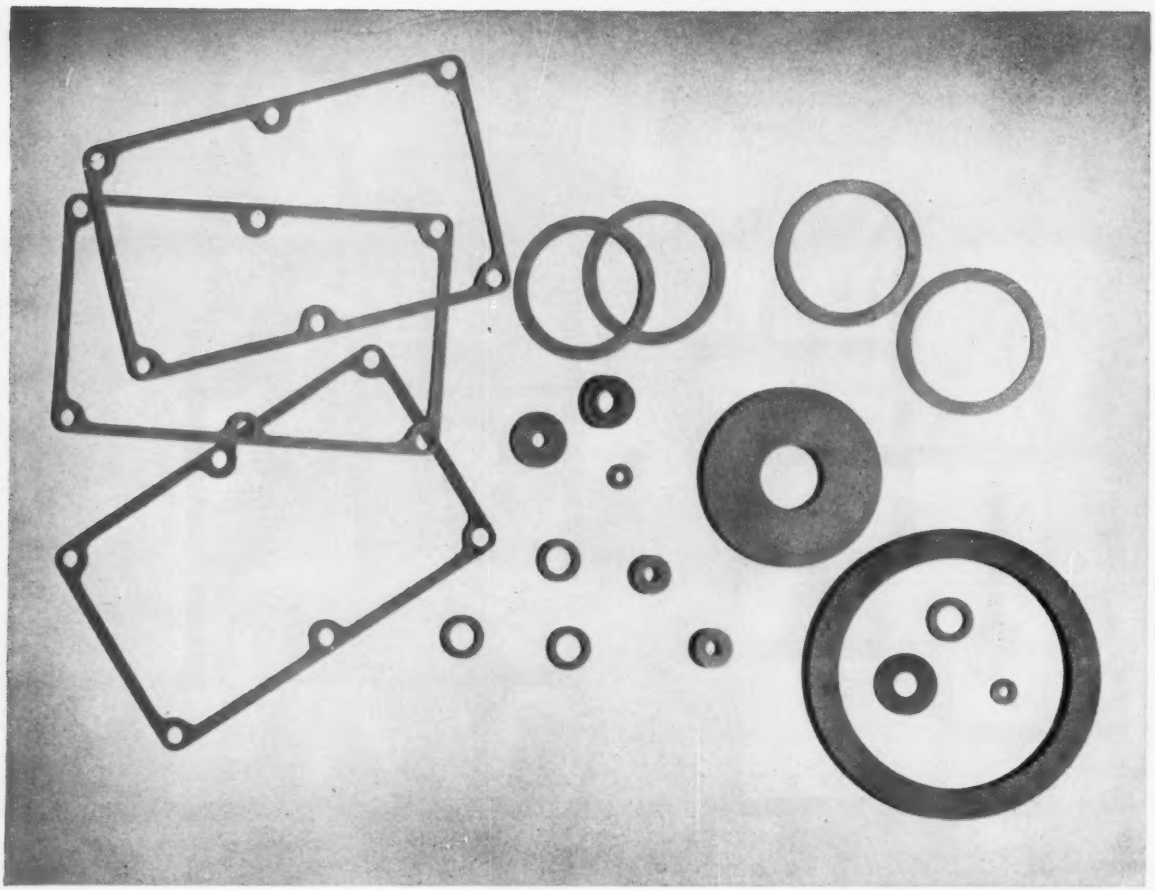

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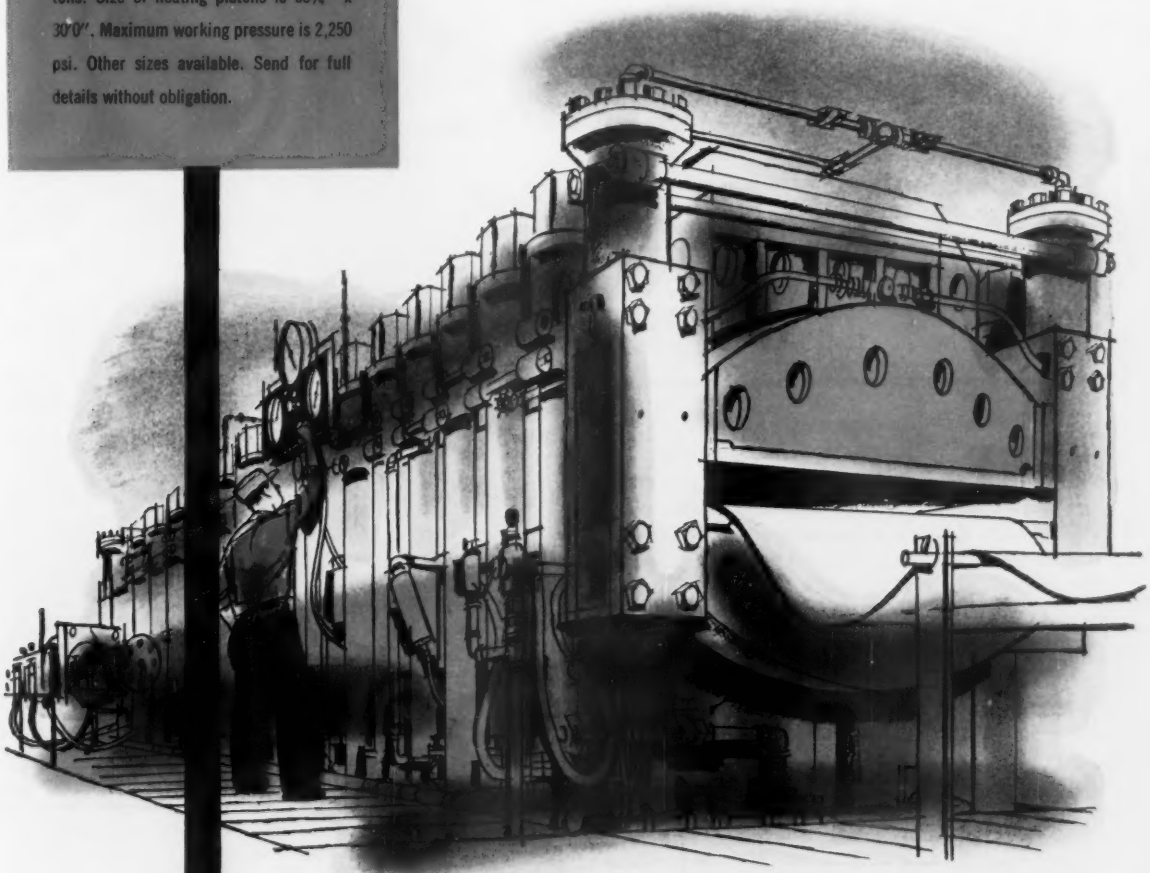

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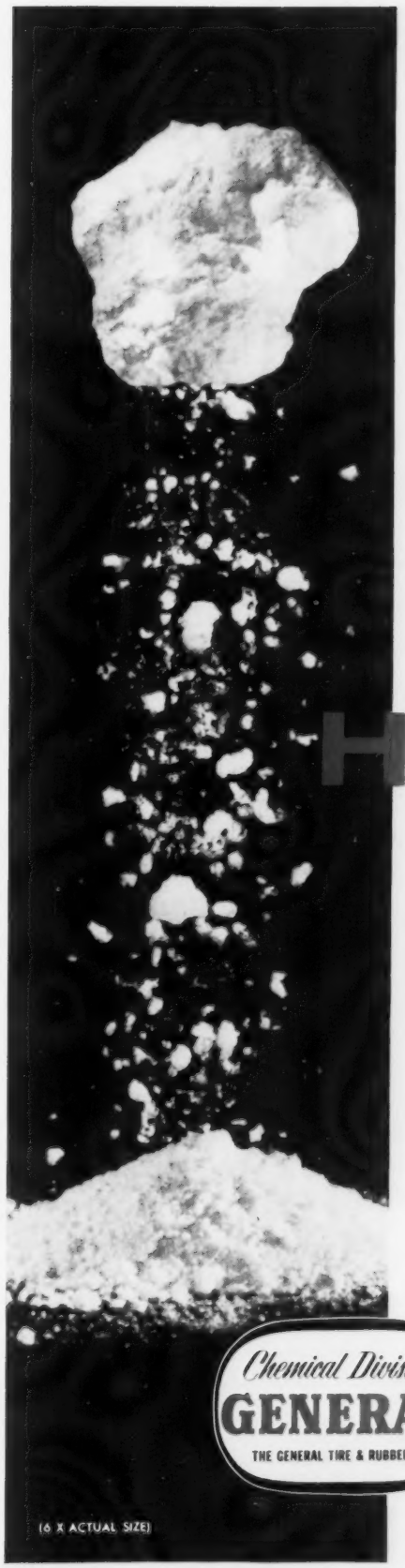

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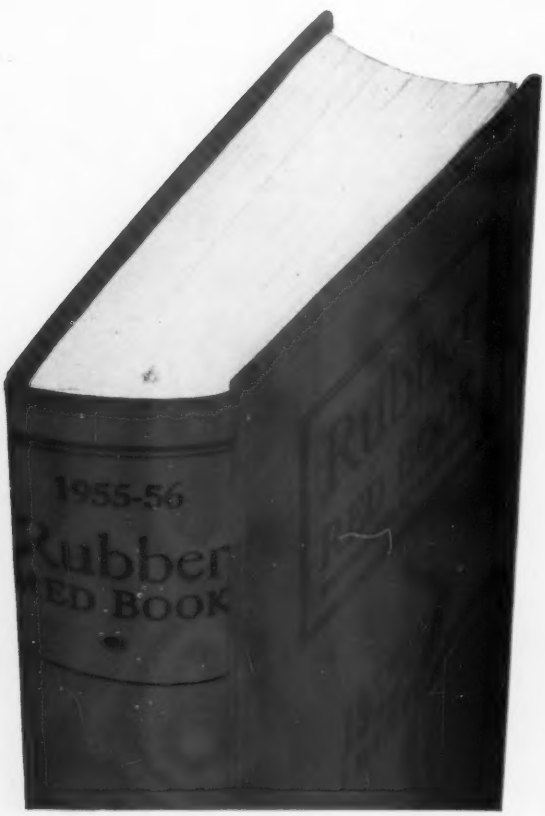

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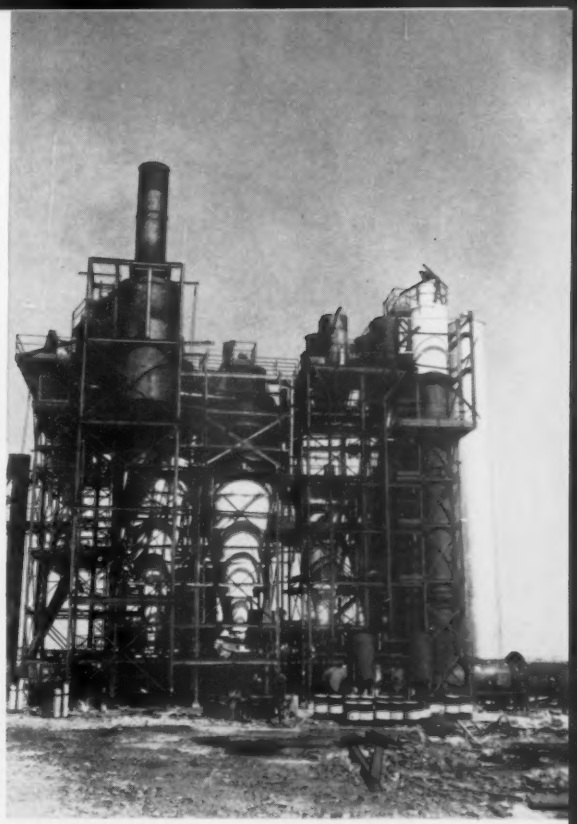

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Rubber Age

Vol. 79, No. 4 JULY, 1956

Some Variables Affecting Modulus of GR-S

By W. K. TAFT,[1] T. B. HARRISON,[2] R. W. LAUNDRIE,[3] and JUNE DUKE[4]
Government Laboratories, University of Akron, Akron 1, Ohio

A systematic investigation of some of the variables encountered in the manufacture of GR-S which may affect the 300% modulus of the polymer is reported. Variations in modulus have been a vexing problem to the industry. The variables reported for either or both "hot" and "cold" rubber are: (1) Soap; (2) Amount of fatty acid; (3) Added sulfuric acid; (4) Mooney viscosity; (5) Conversion, and (6) Type of fatty acid. Some work has also been done on a few other variables.

Within specification limits for the chemical analyses and for Mooney viscosity, the most important variables seem to be the type of fatty acid present in the soap, and, for hot rubber only, the conversion of the contained polymer.

THROUGHOUT the operation of the Government synthetic rubber program *(1)*, and presumably since the sale of the plants to private industry, one of the perennial plant problems has been the meeting of modulus specifications for GR-S. As a general rule, values lower than the specifications have predominated. In certain cases, the difficulties in meeting modulus specifications may have been the limits set, but the major reason has been that methods of controlling this variable were not available.

Some of the factors that could be involved have been systematically studied and reported herein. For polymers made at 122°F., the following factors were investigated: Mooney viscosity, conversion, soap content at a constant fatty acid level, fatty acid at constant soap level, added mineral acid, added calcium, magnesium, aluminum, and ferric soaps, and for polymers made at 41°F., Mooney viscosity, conversion and type of fatty acid.

Although these are not all of the variables, they do include many of the controllable ones.

Results and Discussion

A GR-S-1000 type polymer was prepared at 122°F. to 73% conversion. The polymer was coagulated with brine and isopropanol and dried at 140°F. in a forced draft oven. Chemical analyses were:

Soap (as sodium stearate), %	0.04
Fatty acid (as stearic acid), %	0.42
Phenyl beta naphthylamine, %	1.87
Styrene (refractive index method), %	24.30
Mooney viscosity (ML-4)	61.00

(1) Present address: Aviation Div., Olin Mathieson Chemical Corp., P. O. Box 480, Niagara Falls, N. Y.
(2) Present address: 3151 Watson St., Toledo, Ohio
(3) Present address: General Tire & Rubber Co., Akron, Ohio
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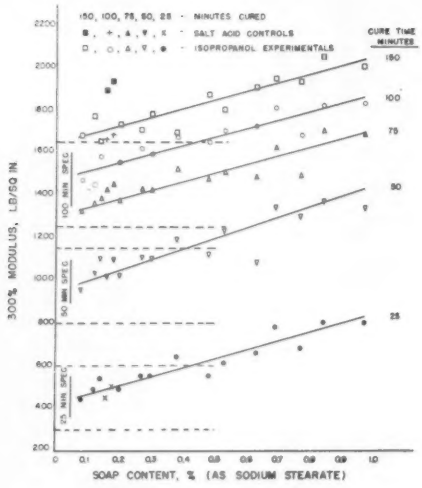


FIG. 1—300% modulus versus increased fatty acid soap.

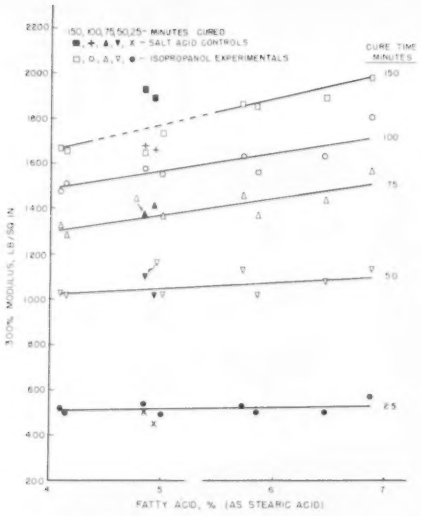


FIG. 3—300% modulus versus increased fatty acid.

A salt-acid coagulated control of the same polymer was 50 ML-4 viscosity. The polymer was mixed on the mill using the following basic recipe:

	(Parts)
Polymer	100.00
EPC black	40.00
Zinc oxide	5.00
Sulfur	2.00
2,2'-di-benzothiazyl disulfide	1.75
Variables (as discussed)	——

Effect of Soap Content: To similar compounds of the alcohol coagulated polymer was added 4.75 parts of fatty acid (calculated as stearic acid) prepared from ORR soap flakes and 0.10, 0.25, 0.40, 0.55, 0.70 or 0.90 part of sodium soap of fatty acid (ORR soap flakes). The salt-acid coagulated control polymer was also mixed with an amount of fatty acid equal to the total stearic acid in the above experimental batches. The acids and soaps were added during the 10 minutes mill mixing period *(2)*. The compounds were cured at 292°F. for the times shown in the figures.

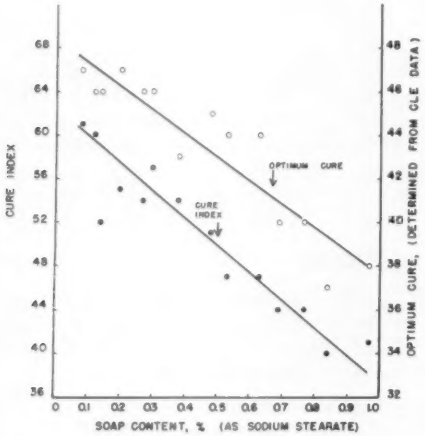


FIG. 2—Cure index and optimum cure versus increased fatty acid soap.

The modulus values and the analyzed soap content are shown in Figure 1. The modulus increased at all cures with an increased soap content, and at the maximum soap content allowable by the specification (0.75%), soap content had an effect. With this particular polymer with a soap content above 0.40% the modulus was not in accord with specification. It should be noted that the modulus of the control polymer used was slightly above specifications at the 100-minute cure. These results would seem to indicate that low modulus is not caused by soap variations, based upon the usual 0.1 to 0.2% soap levels in normal GR-S.

Increasing the soap content decreased the time of optimum cure as indicated by the t_p values *(3)* determined from strain data (CLE), and the cure index determined from the Mooney scorch test *(4)*. These results are shown in Figure 2.

Effect of Fatty Acid Content: As the specifications for fatty acid content in GR-S-1000 are between 4.00 and 6.25%, experiments were made with the alcohol coagulated polymer and using the same basic recipe shown above, adjusting the soap content to contain 0.14% and using varying amounts of fatty acid, namely, 4.00%, 4.75%, 5.50%, and 6.25%. This was done to determine whether variations within the specification range for fatty acid would significantly affect the modulus of the cured stocks.

The modulus results for the same cures indicate, as shown in Figure 3, that at the 25 and 50 minute cures variations of the fatty acid had no significant effect on the modulus values. At the longer cures, there was an increase in modulus with increase in fatty acid content, although this change was much smaller than the change in modulus caused by the soap content shown in Figure 1. Thus, control of fatty acid soap in processing is important in control of modulus, whereas in general, the normal variations in fatty acid are of no importance, except possibly for the vulcanizates which were cured for 100 minutes.

The variations in fatty acid within specification limits had no significant effect on the cure, as measured by t_p or the cure index.

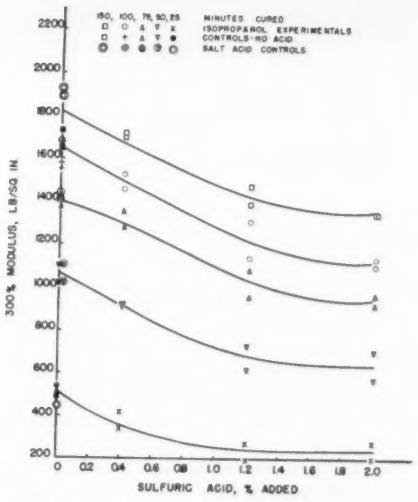


FIG. 4—300% modulus versus increased sulfuric acid.

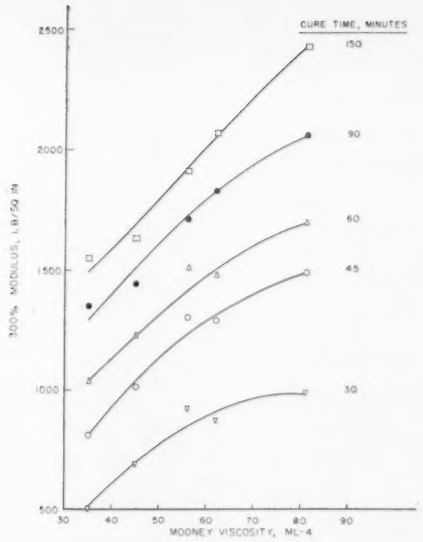


FIG. 5—Effect of ML-4 viscosity on modulus at various cure times. (GR-S of 72 ± 3% conversion).

Effect of Addition of Sulfuric Acid: To study the effect of sulfuric acid on modulus, 400 grams of polymer were used in the basic recipe, with 4.75% of fatty acid and 0.14% soap, then, none, 0.4 ml., 1.2 ml. and 2.0 ml. of 98% sulfuric acid were added to the polymer during mill mixing. The effect of the acid was to reduce the soap content to zero, and to lower progressively the fatty acid content as determined by analysis of the ETA extract *(2)*. It is presumed that the sulfuric acid dehydrated the fatty acids to the anhydrides. The increase in the amount of sulfuric acid lowered the 300% modulus as shown in Figure 4.

Effect of Insoluble Soaps: The addition of 0.1% of calcium, magnesium, aluminum or ferric fatty acid soap in the basic recipe with 0.2% O.S.R. fatty acid soap and 5% O.S.R. fatty acid both present seemed to have a negligible effect on the modulus. All of the polymers met the O.S.R. minimum specification for modulus. (Data not shown.)

In the foregoing parts of the discussion, some of the variables introduced by the coagulation procedure have been shown and when other specifications were met these variables seemed to have little influence on modulus. For instance, if enough sulfuric acid was left in the rubber to have a significant effect, except in marginal cases, the fatty acid was significantly reduced and probably was below specification limits. Therefore, factors other than coagulation variables remain to be considered.

The next variables investigated were related to polymerization. Two obvious variables are Mooney viscosity and conversion. A series of batches were polymerized in 500-gallon reactors to various ML-4 viscosities and conversion levels according to the GR-S-1000 formula. The DDM charges were altered to vary the Mooney viscosity. Latices having the desired conversion and con-

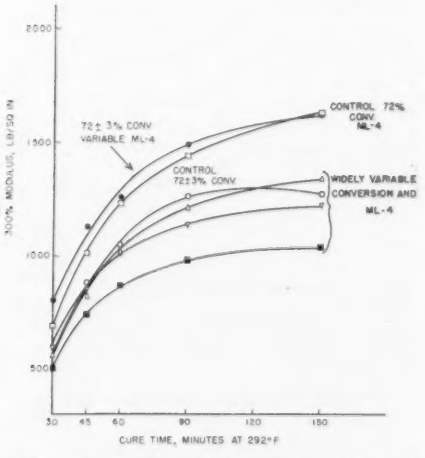

72 ± 3% CONV VARIABLE ML-4
CONTROL 72% CONV ML-4
CONTROL 72±3% CONV
WIDELY VARIABLE CONVERSION AND ML-4
300% MODULUS, LB/SQ IN
CURE TIME, MINUTES AT 292°F

FIG. 6—Effect of blending at about 45 ML-4 of blend.

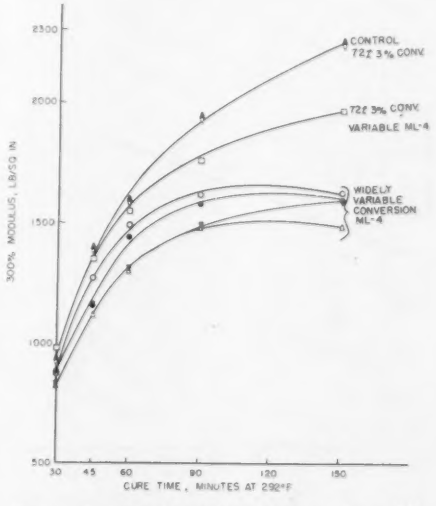


FIG. 7—Effect of blending at about 75 ML-4 of blend.

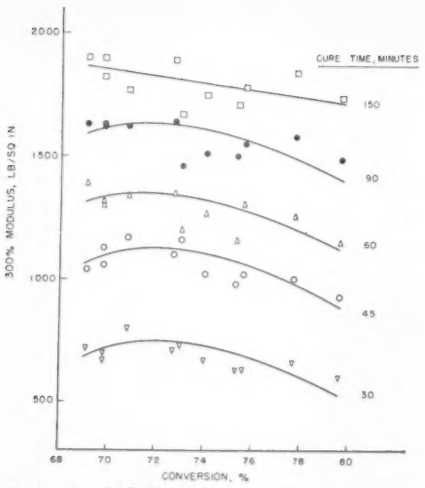


FIG. 8—300% modulus versus conversion.

tained polymer Mooney viscosity were either blended or used alone, coagulated with salt and acid and dried. The resulting gel-free polymers were compounded according to the following recipe, cured at 292°F. and the modulus determined:

	(Parts)
Polymer	100.0
EPC black	50.0
BRT No. 7	5.0
Zinc oxide	5.0
Sulfur	2.0
2-mercaptobenzothiazole	1.5

Mooney Viscosity at Constant Conversion: The modulus increased for polymers (latex conversion *72 ± 3%*) as the Mooney viscosity of the polymers increased. The effect of Mooney viscosity on the 300% modulus at each cure time is shown in Figure 5. An increase in Mooney viscosity from 35 to 81 ML-4 caused an increase in the 300% modulus of the 30-minute cure from 500 to 1000 pounds per square inch, and resulted in numerically greater differences as the cure times increased.

Conversion at Constant Mooney Viscosity: The same type latices as described above were either blended or used as prepared, coagulated, dried, and cured as described above. In production, latex blends could be made in two ways: (1) with latices of *72 ± 3%* conversion and with a contained polymer of variable Mooney viscosities, and (*2*) with latices of widely varying conversion and contained polymer Mooney viscosities. A third possibility was blending latices of widely varying conversion and relatively constant Mooney viscosities. Ordinarily, the last method is not encountered if a constant charge is used, and therefore has not been considered.

At two Mooney viscosity levels (about 45 and 75 ML-4), the effect of these two types of latex blending (1 or *2*) is shown in Figures 6 and *7* and is compared to non-blended control made to *72 ± 3%* conversion and the desired viscosity levels. These figures show in both cases that blends of latices of high and low conversion and contained polymer with high and low Mooney viscosities cause a marked reduction of the 300% modulus, but that blending of latices of constant conversion with contained polymer of variable Mooney viscosity results in 300% modulus relatively similar to the control. This suggests definitely that modulus values are at a peak at about *72%* conversion and are considerably lower at either higher or lower conversions.

The 300% modulus data in Figure 8 substantiate this conclusion. In this case the polymers were made to a constant Mooney viscosity of 52 ML-4 in a similar polymerization formula, with latex conversions varying from 69 to *79%*. Except for the overcure (150 minutes), maxima are shown at about *72%* conversion.

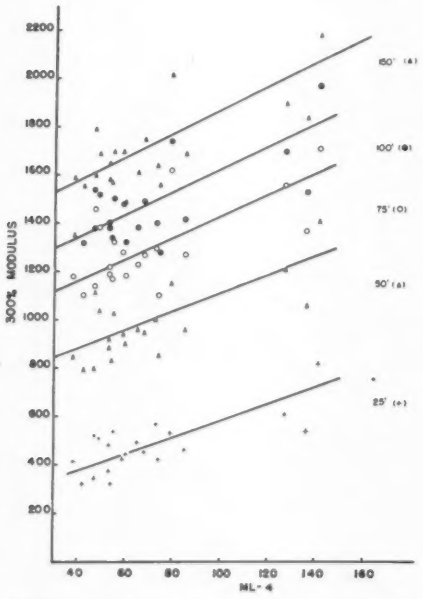


FIG. 9—Effect of ML-4 viscosity on modulus at various cure times. (GR-S-1500 of 61.3 ± 2.2% conversion).

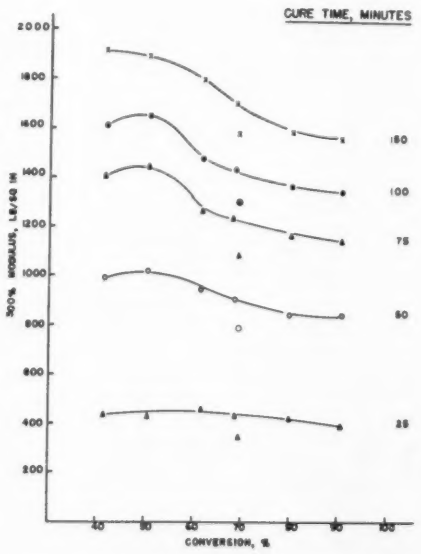


FIG. 10 — 300% modulus versus conversion. (Polymers of 57 ± 3 ML-4 viscosity).

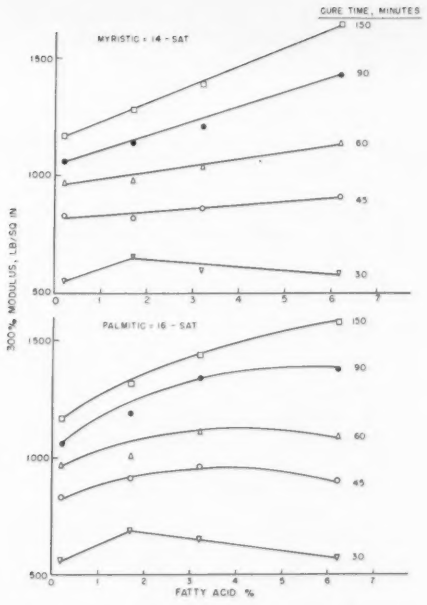


FIG. 11—Effect of myristic and palmitic acids on modulus.

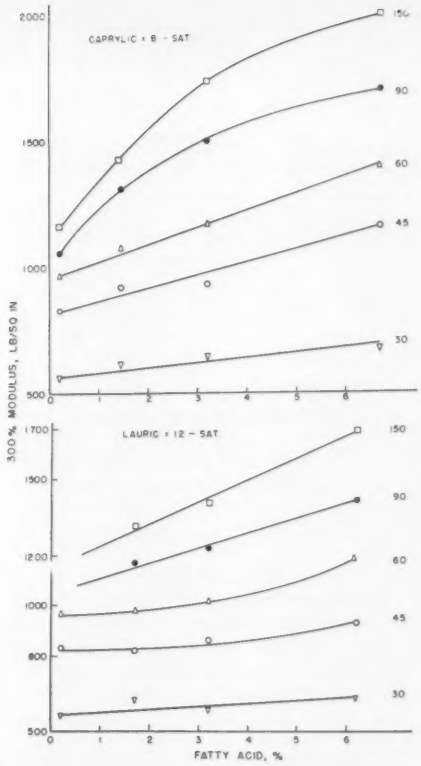


FIG. 12—Effect of caprylic and lauric acids on modulus.

These data indicate that with polymers made to 72 ± 3% conversion, the variations within the Mooney viscosity specifications of 44 to 52 ML-4 can mean a spread of from 670 to 790 lbs./sq. in. in the 300% modulus at the 30-minute cures, in compounds prepared according to the recipe used. At a constant Mooney viscosity of 45 ML-4, polymers made from latex blends representative of high and low conversions can change the 300% modulus to 500 lbs./sq. in. from 700 to 800 lbs./sq in. for polymers made to conversion limits of 72 ± 3%.

Thus, if conversion is controlled, and the highest specification viscosity polymer is made, 300% modulus values of 920 lbs./sq. in. are possible, whereas if the lowest specification viscosity polymer is made by blending high and low conversion polymers, 300% modulus values of 500 lbs./sq. in. may result. Present specifica-

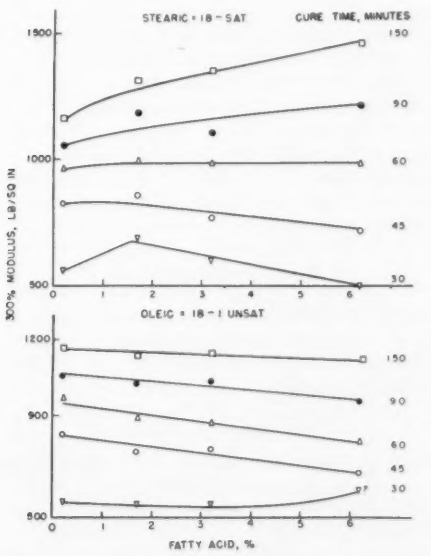


FIG. 13—Effect of stearic and oleic acids on modulus.

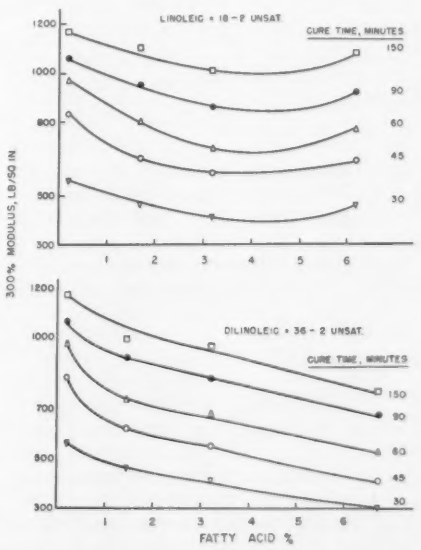


FIG. 14—Effect of linoleic and dilinoleic acids on modulus.

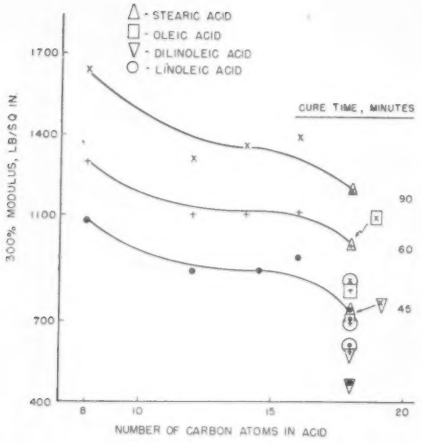


FIG. 15—Effect of carbon chain length of fatty acid on modulus.

tions would be 420 to 740 lbs./sq. in. at the 30-minute cure. As variations in the 300% modulus of 30-minute cured specimens have been from 500 to 920 lbs./sq. in. and conversion is the major factor in causing this spread, which is greater than allowed for in the specifications, plant control should obviously be based on conversion, not viscosity.

Mooney Viscosity at Constant Conversion (Cold Rubber): Polymers prepared according to the GR-S-1500 formula (rosin acid soap) to various Mooney viscosities at a monomer conversion level of 61.3 ± 2.2% were compounded by the following recipe, cured at 292°F. and stress-strain properties determined:

	(Parts)
Polymer	100.0
EPC black	40.0
Zinc oxide	5.0
Sulfur	2.0
2,2′-di-benzothiazyl disulfide	3.0
Stearic acid	1.5

The 300% modulus at the various cure times were plotted against Mooney viscosity and the results shown in Figure 9 indicate the same type of increase in modulus with ML-4 viscosity of "cold" rubber as shown in Figure 5 for "hot" rubber.

Conversion at Constant Mooney Viscosity (Cold Rubber): GR-S-1502 (mixed soap) latices, with conversion levels from about 40 to 70% and containing polymer averaging 57 ± 3 ML-4 viscosities, were coagulated, dried, compounded according to the recipe following, cured at 292° F. and stress-strain properties determined:

	(Parts)
Polymer	100.0
EPC black	40.0
Zinc oxide	5.0
Sulfur	2.0
2,2′-di-benzothiazyl disulfide	2.0

The 300% modulus at the various cure times plotted against conversions are shown in Figure 10 and indicate that at about 50% conversion a maximum modulus is found at each cure except possibly the 25-minute cure. These results are essentially similar but much less significant in extent as compared to those shown for "hot" rubber in Figure 8, in that at 50% conversion "cold" rubber has a maximum modulus instead of at 72% conversion as found for "hot" rubber.

Soap Type (Cold Rubber): A latex prepared at 41°F. by the low-sugar CHP formula to 60.8% conversion and 45 ML-4 viscosity for the contained polymer was creamed with 10% salt solution, coagulated with isopropanol, washed and dried. The polymer contained 0.25% soap (as sodium stearate) and 0.20% fatty acid (as stearic acid). This polymer was used for determining the effect on the 300% modulus of the vulcanizates of varying amounts of relatively pure fatty acids. They were added by mill mixing according to the compounding recipe shown below:

	(Parts)
Polymer	100.00
EPC black	40.00
Zinc oxide	5.00
Sulfur	2.00
Altax	1.75
Acid (type variable)	Variable

Listed below are the fatty acids used, together with the number of carbon atoms in the chain, whether saturated (S) or unsaturated (U) acids and the number of unsaturated links (number):

Caprylic	(8-S)
Lauric	(12-S)
Myristic	(14-S)
Palmitic	(16-S)
Stearic	(18-S)
Oleic	(18-U-)1)
Linoleic	(18-U-)2)
Dilinoleic	(36-U-)2)

The effect of as much as 6% of each fatty acid on the 300% modulus is shown in Figures 11 through 14. The fatty acids with the lower number of carbon atoms increased the cure per unit weight of the acid faster than did the longer chain acids. Also, unsaturation decreases the 300% modulus and the dimerized acid is the most active in decreasing the cure rate. In Figure 15, the relationship of acid to modulus is shown graphically for the vulcanizates at the three middle cure times.

Within the specification limits presently used, changes in Mooney viscosity cannot be considered as a means of significantly affecting the modulus results. With "hot" rubber, control of conversion is shown to be important on modulus, while with "cold" rubber, the control of conversion has little effect on modulus. The results obtained with the various soaps suggest that if polymerization rates are satisfactory, indicating little or no short chain acids present, and low modulus is obtained, unsaturated acids or possibly dimerized unsaturated acids are possibly present in the soap.

SPECIAL NOTE

The work reported herein was done under the sponsorship of the Reconstruction Finance Corporation and the National Science Foundation as part of the government rubber program.

LITERATURE REFERENCES

(1) Private communications to Office of Synthetic Rubber.

(2) Reconstruction Finance Corp., Office of Synthetic Rubber. Specifications for Government Synthetic Rubber, revised edition, October 1, 1952.

(3) Schade, J. W., *India Rubber World*, Vol. 123, p. 311 (1950).

(4) Shearer, R., Juve, A. E., and Musch, J. H., *India Rubber World*, Vol. 117, p. 216 (1947).

Push Button Foam Rubber

A Description of the New Dunlop Canadian Factory Depicting the Production of High Quality Latex Foam Rubber

By JOSEPH L. WEBSTER

WHAT has been called the world's most modern plant for the production of latex foam is now working on a 24-hour basis at Whitby, Ontario, Canada. It is the property of Dunlop Canada, Ltd., whose parent organization originated latex foam in 1928. It is devoted exclusively to manufacturing a wide variety of cushioning shapes and sizes under Dunlop's Pillofoam brand.

In its latest installation, Dunlop has drawn on a wealth of world-wide experience, including that gained from the operation of the Dunlop U.S. company's 2-year-old facilities at Buffalo. The new plant was built by Canadian Mechanical Handling Systems Co., Ltd. This concern is a subsidiary of Mechanical Handling Systems, Inc., which company acted in a like capacity on the Dunlop-Buffalo job.

Before describing the new plant, it seems appropriate to touch on the process employed by Dunlop in foaming latex. This involves mechanical frothing, with the incorporation of a gelling agent such as silico-fluoride. It is in contrast to the chemical frothing procedure, where hydrogen peroxide and an oxygen releasing activator are introduced into the compounded latex. In the Dunlop method the frothed compound is poured into molds, where it sets up and holds its shape like meringue in a few minutes. Curing follows immediately.

In the chemical foaming method the latex mix, plus the foaming agent, are placed in a mold which is then closed. The mixture foams, is frozen, gelled by the introduction of carbon dioxide gas, then cured. Dunlop favors its process as simpler, faster, more accurate and cheaper.

The new factory follows the modern concept of functional design—high-ceilinged single-storied construction in the main, with generous window areas and abundant provision for natural ventilation. An eye-easy interior color scheme has been achieved through the use of two tones of green for walls and equipment and an off-white for the ceiling.

The building was prefabricated to a substantial degree, and the architects planned for fast, economical future expansion. The steelwork is blocked in at the base by low walls of poured concrete and brick. Above them rises a sheathing of double Transite.

Plant Flow Pattern

Latex is received at Whitby in 9,000-gallon railroad tank cars and 3,000-gallon tank truck loads. Truck shipments come some 6,000 miles from Boston, two round trips being scheduled weekly. Pressure unloading is to 20,000-gallon indoor storage tanks. Now begins the plant flow pattern shown in Figure 1. To prevent creaming of the latex and surface coagulation, these tanks are equipped with agitators of the slow speed turbine type rather than high speed propeller agitators. The next transfer is by pressure to 2,000-gallon compounding tanks. These have their tops extending through openings in the floor above. On this floor is a mezzanine. It houses a row of smaller tanks in which various aqueous dispersions are stored.

Raw materials, other than latex, are handled in pallet loads, using fork lift trucks. Loads are stored on pallets on the third floor. This, incidentally, is the only section of the plant which is above one story. Here are prepared aqueous dispersions. Equipment includes slurry tanks and a battery of Szegvari attritors. Dunlop chose these attritors in preference to standard ball mills because of their ease of operation and their effectiveness in grinding powders to a very fine particle size for good dispersion in less than 24 hours. After preparation the dispersions are drained or pumped into the mezzanine-mounted storage tanks on the floor below.

Special Kettle for Liquid Soap

An interesting feature of third floor operations is a special kettle devoted to the manufacture of liquid soap. This large tank is jacketed, and ethylene glycol is pumped through the jacket to control the temperature of the soap making ingredients. The glycol can be heated or cooled rapidly by diverting it through a steam heat exchanger or a cold water heat exchanger. Required coolant diversion is handled by an automatic temperature controller-recorder.

As will be realized from the foregoing, the entire compounding section has been designed to reduce to a minimum physical labor. It is built to take fullest advantage of the cheapest, smoothest moving force . . . gravity.

As shown in Figure 2, each dispersion storage tank is painted a separate color to identify instantly its contents. Each has an individually motor driven agitator to ensure maintenance of uniform solids suspension. Each has its own automatic temperature control.

Great care is exercised in the treatment and conveyance of water used in the dispersions. A Permutit demineralizing system provides the equivalent of distilled water. It employs two ion exchange beds, one to remove metal ions, the other to remove acid ions. All supply lines are of stainless steel with welded fittings. Water is autostop-metered to assure the delivery of exactly predetermined quantities to slurry tanks, attritors, etc.

Materials from the dispersion storage tanks are drawn off for addition to the latex in the compounding tanks.

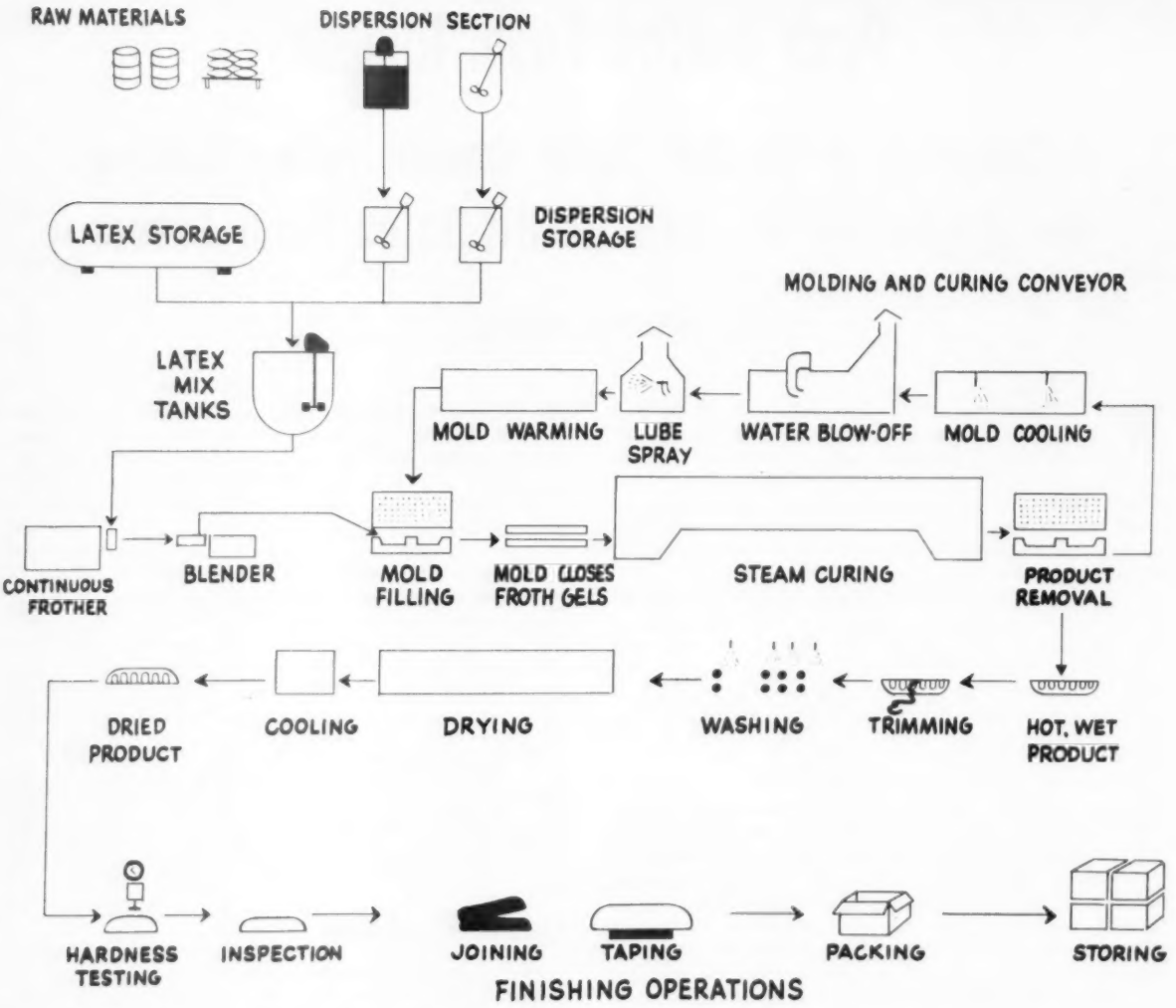


FIG. 1—Flow chart showing latex foam rubber production at Dunlop's new Canadian factory.

This calls for precise weighing, and Dunlop does the job with dispatch. There is no pumping, no hand carrying, no waste. Instead, a traveling scale and weigh bucket car is utilized. This is suspended from a monorail fixed in front of and above the dispersion tank line-up. The operator travels up and down the line at will. He draws off each dispersion separately, while the scale's dial shows him the weight loaded and checks him with a printed record. He then travels to the particular compounding tank he is servicing and drains the dispersion into the latex.

Ammonia is added to latex as a preservative during shipment. Most of this must be driven off before compounding can take place. This involves stirring, in each compounding tank, some 10 tons of latex. Agitation is provided by 2-speed off-center paddles. This gives a top-to-bottom agitation without the use of baffle plates and with a complete absence of splashing. The cyclic upturning of fluid changes the surface area continuously. As the ammonia fumes are exposed to the surface area, they are carried away by exhaust currents. Dunlop's compounding tanks have wide hinged lids, and the ammonia exhaustion system relies on a large volume of low velocity air being drawn across the surface.

Following ammonia removal, vulcanizing ingredients are added. Then the latex, under agitation, is held for a further 24 hours to mature. Very accurate temperature control is demanded during the maturing process. To gain this, each mixing tank has its own separate water jacket system. The water in the jacket is recirculated continuously. It can be heated by steam or electric heaters or cooled by admitting cold water. Mechanical refrigeration keeps the cold water at the necessary low temperature. Controlled temperature is held automatically through air top valves which are actuated by each tank's temperature controller. The operator merely sets the controls. The system does the rest. Noteworthy is the fact that the compounding tanks are lined with a baked-on plastic coating which reduces coagulation markedly.

After maturing and final compounding, the latex is piped by gravity to the frothing station. A delay tank is used to provide additional temperature control. Dunlop uses an Oakes frother. This is best described as a continuous mixer. In it latex and air are mixed at

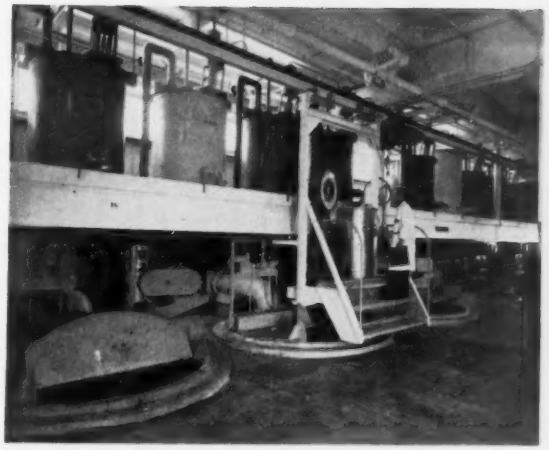


FIG. 2—Each dispersion storage tank is painted a separate color to identify instantly its contents.

FIG. 3—The operator places the foam in the mold spreading it to a uniform height.

known, closely controlled rates under pressure. The Oakes unit had its beginning as a marshmallow maker, but it works equally well for foam rubber production. The mixer head produces a froth having a very fine and very uniform bubble size.

From the mixing head the foam passes into a blender of unique design. Its function is to mix thoroughly the gelling agents which are introduced into the foam at this stage by a variable speed diaphragm pump. Because of its remarkably simple design, this blender can be operated for long periods without disassembly for cleaning or other attention.

Molding and Curing Conveyorized

Molding and curing are completely conveyorized, and molds of all sizes pass a single frothing station. Here a pourer dispenses foamed latex from a long plastic hose after the fashion of a pastry cook dishing out whipped cream. Pallets, traveling on a conveyor, carry the molds. The bottom section of the pallet carries the mold bowl. The top section of the pallet supports the mold lid, and is hinged to the bottom section of the pallet. A roller is attached to the front edge of the pallet frame's top. This roller follows a cam rail alongside the conveyor route, causing the lid to open and close automatically.

As each mold approaches the pourer, it is open, as shown in Figure 3. Then, as it slowly passes him, he wields a plastic hose, spreading out the foam to a uniform height. Skillfully he levels off overloads and transfers excess material to the following mold. The amount of foam required for each mold is best determined by time filling. Success of this operation, however, is governed greatly by the skill of the pourer and the Oakes frother operator. Travel time on the conveyor is provided for the latex foam to gel before the molds enter the curing chamber.

Vulcanization temperature in the long steam tunnel is held automatically at 210° F. Steam within the tunnel is trapped effectively by having the major portion well above the entrance and exit openings. Any minor steam spillage out the ends is rapidly and effectively exhausted by suction ducts.

Between the time cured products are removed from the molds and the molds are refilled, the molds are carried through four conditioning chambers. This procedure is entirely automatic, and on it depends quality production and easy stripping. Cooling is the first step. It is accomplished through the use of drenching sprays of temperature controlled water. Next, the molds are rendered completely dry by subjecting them to high velocity air jets. Now comes a passage through an automatic DeVilbiss spray booth for spraying with lubricant. Finally the lubricant is dried and the molds brought to proper refilling temperature by running them through a warm air chamber.

Emerging from the curing tunnel, the molds open automatically. The Pillofoam products are hot and wet. In this condition they require careful handling to prevent distortion. Flash is trimmed off, then the Pillofoam is conveyed to the washer unit. Hot water —tons of it—is used to remove soap, excess curing chemicals and all traces of odor. The operation includes passage through giant wringer rolls, shown in Figure 4, that squeeze the material throughout its porous mass.

Next, the washed Pillofoam goes on a very special conveyor belt for a trip through the dryer. This belt is a very costly construction, built of woven stainless

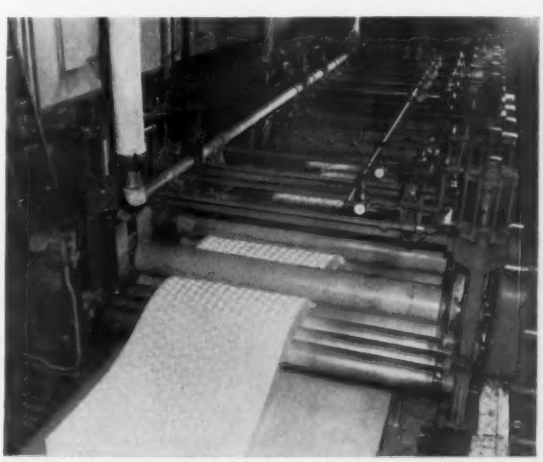


FIG. 4—Giant rolls squeeze moisture from the foam after it has been washed.

steel. Again extreme care is observed to see that each item is placed fully flat on the belt. This continuous, hot-air dryer is a new type, designed and patented by Mechanical Handling Systems, Inc., Detroit. The dryer is built in 10-ft. sections, each section having a powerful fan to force hot air through the products as they pass through the section on the mesh belt. Fresh air is brought in at each end of the dryer and passed from section to section to the central exhaust duct. The air is heated by steam coils, thermostatically controlled, in each section, and temperatures vary from 250°F. at the wet-product end to below 200°F. at the dry-product end. A short cooling section follows the dryer, so that the products will not be handled when hot.

The finishing section works only two shifts—days and afternoons, so night shift production is stored on an overhead conveyor built especially for this purpose. Inspection is rigid, and Dunlop is proud of a Dunlop-designed compression-deflection tester, shown in Figure 5, which indicates visually the firmness of the finished Pillofoam. This check not only provides a quality gauge point, but guards against wasteful practices—too high density, careless handling, and the like.

Automation is the order of the day at Dunlop. Four principal conveyors completely eliminate hand or mechanical truck handling of products. One takes care of the filling, curing, stripping and mold reconditioning circuit. A second one carries the cured Pillofoam through the finishing, washing and drying operations. A third stores night shift output and a fourth carries products to the sorting, packing and warehousing sections. Crossover conveyors link the main lines.

Automatic production techniques provide many benefits. Dunlop gains directly through increased efficiency, lowered costs and high man hour outputs. These benefits add up to an improved competitive position. Employees enjoy agreeable, fatigue-free working conditions and a greater probability of steady employment. At the consumer level, Dunlop offers the public products of a higher and more uniform quality than have been available in Canada prior to the installation of this modern equipment. There is no finer latex foam manufactured anywhere in the world, than that produced in the new Dunlop Whitby factory.

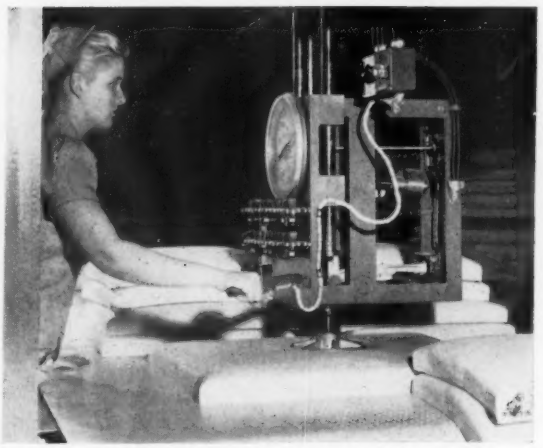


FIG. 5—The Dunlop-designed compression tester indicates visually the firmness of the foam.

Coming Next Month...

"Exposure Cracking of Sidewall Compounds"—by D. C. Edwards and E. B. Storey, Research and Development Division, Polymer Corp., Ltd., Sarnia, Ont., Canada.

A study of the ozone cracking behavior of Polysar S (GR-S) sidewall compounds is described. Three types of experimental procedures were developed for this study, and the development and application of these techniques are considered.

"Proposed Tentative Specifications and Methods of Test for Flexible Urethane Foam"

Prepared by the Flexible Urethane Foam Test Methods Subcommittee of the SPI Cellular Plastics Division, these tentative specifications cover pertinent tests for flexible urethane foam.

"The Use of Reclaim in Rubber Goods"

A report of a recent panel discussion held by the Connecticut Rubber Group in which such subjects as how reclaim is made, commercially available types, and future markets are discussed.

Abstracts of Papers for the Fall Meeting of the Division of Rubber Chemistry, A.C.S., September 19-21, Atlantic City, N. J.

Complete abstracts will be published including abstracts of the papers to be presented at a Symposium on the Literature of Rubber sponsored by the Rubber Division and the Chemical Literature Division.

Plus several short practical articles.

Latest Developments in Butyl Rubber

Report of a Panel Discussion Held by the Rhode Island Rubber Club

THE Rhode Island Rubber Club, at its Fall Meeting, held December 1, 1955, at the Pawtucket Country Club, Pawtucket, R. I., featured a panel discussion on Butyl rubber. The discussion was moderated by W. H. Peterson of Enjay Co., Inc., and the panelists included the following: R. M. Thomas (Esso Research), William H. King (Acushnet), Emil W. Schwartz (Southern Clays), Carl H. Lufter (Goodrich Chemical), and George Barclay (Xylos Rubber). Mr. Thomas, who is Assistant Director, Chemicals Research Division, Esso Research and Engineering Co., Linden, N. J., is the co-inventor of Butyl rubber and has had 20 years experience with polymer synthesis.

The papers given by the panelists, as well as the questions and answers which followed the panel discussion, are presented herewith.

Composition and Manufacture of Butyl Rubber

By R. M. THOMAS

Chemical Research Division, Esso Research & Engineering Co., Linden, N. J.

THIS year is the 15th anniversary of the announcement of the discovery of Butyl rubber. During the past 10 years all of us have come to know this unusual product as inner tube rubber because of its superior ability to hold air and maintain good physical properties during service. During coming years we expect to know the product on the basis of more widespread usage and volume production. Its general properties and favorable economic structure offer opportunities of exceptional promise. In discussing Butyl, therefore, let us consider its background with regard to chemical composition and method of manufacture.

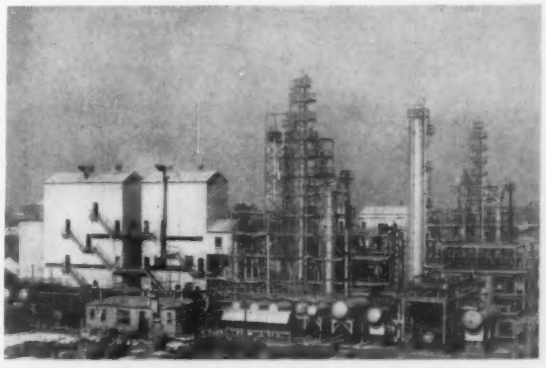
Butyl rubber is made by copolymerizing two by-products from the cracking of petroleum isobutylene and isoprene. By polymerization, it is possible to join a large number of small molecules together to make one unit which is long and thread-like. Here, approximately 10,000 starting molecules join together to make a single unit. From the structure of the end product it is to be noted that isobutylene joins head to tail and that isoprene enters the picture predominently by 1-4 addition. It should be emphasized that the Butyl polymer is composed mainly of isobutylene, having only 1 or 2 mole percent of isoprene present.

The reaction by which the rubber is made is a rapid and exothermic one. It is conducted at very low temperatures because this gives a product of higher molecular weight. In general, isobutylene containing a few percent of isoprene, together with methyl chloride diluent to aid in control of the reaction, is cooled to approximately —150° F. and treated under conditions of intense agitation with a dilute solution of anhydrous aluminum chloride in methyl chloride. Under these conditions polymer is formed almost instantly in particles of very small size. These can be handled as a non-viscous cold slurry which is removed from the reactor by continuous flow through a short length of pipe.

Isobutylene mixed with isoprene and methyl chloride together with dilute recycle is fed to a reactor continuously. Aluminum chloride dissolved in pure methyl chloride is introduced as catalyst. These materials displace a corresponding volume of equilibrium feed-polymer mixture into a vessel containing agitated hot water which is referred to as a flash tank. The reactor, incidentally, is jacketed with boiling ethylene so that its contents are kept at a low temperature at all times.

Methyl chloride and unreacted components are separated from the rubber in a flash tank and are taken overhead for recovery. The gases are compressed, dried over activated alumina, further compressed, and distilled. Normal butenes and bottoms fractions are purged before returning the feed to recycle. A small amount of pure methyl chloride is taken overhead for catalyst preparation.

Going back to the flash tank, rubber is recovered as a slurry of rice-like particles in hot water. The latter with its complement of slurry is pumped continuously to a vibrating screen or Oliver filter where it is separated as wet crumb, passed through a tunnel drier, extruded, hot milled, cooled, and packaged.



Over-all view of Enjay's Butyl rubber plant at Baton Rouge, Louisiana.

Butyl Rubber in Wire and Cable Extrusions

By EMIL W. SCHWARTZ

Rubber & Plastics Division, Southern Clays, Inc., New York, N. Y.

THERE appeared in the July-September, 1955, issue of *Rubber Chemistry and Technology* an article entitled "The Effect of Fillers on the Permeability of Rubber to Gases," by G. J. Amerongen, Rubber Foundation, Delft, Netherlands. Two charts (Figures 1 and 2) used in that article will help to answer a question which was solicited by the Committee. The question is: "When mixing Butyl rubber in a Banbury we run our temperatures higher than we normally would to drive out any moisture. Why?"

In Figure 1 the permeability of different types of polymers to air at 25° C. shows that with natural rubber the air permeability is 100%, GR-S 75%, the acrylonitriles about 18%, neoprene 15%, and Butyl rubber 5%.

In Figure 2 the nitrogen gas permeability of pure gum natural rubber versus gum Butyl at three different temperatures, namely, 25°, 50° and 100° C., is shown. From this data it is apparent that the passage of gases through a mass of Butyl polymer is very low. Air, admixed, and surface moisture on the fillers, entrapped in the normal procedure of mixing, will not permeate through the mass of Butyl compound unless the temperature is raised to induce a better vapor gas transmission rate. High temperature mixing is essential to prevent vapor and gases being entrapped in the walls of extruded insulation before vulcanization takes place.

Apart from the vapor gas transmission rate being quite different from other polymers, there is still another aspect of why high temperature mixing is so desirable for Butyl insulation compounding.

Figure 3 shows the effect of low temperature mixing, which is the usual procedure for most other polymers. Shown is a piece of unvulcanized Butyl base stock with no vulcanizing agents added. In order to obtain a suitable specimen the compound was subjected to dry ice, which procedure gave about —40° F. microtomed, which is not easy, and photomicrographed at 50 magnifications. What is shown here can hardly be called good dispersion. Since the so-called scrubbing effect of Butyl rubber is low, the increased temperature causes the polymer to flow around the non-black fillers to get the essential coating or dispersion. Most certainly the fundamental concept that the best possible dispersion gives the best physical and electrical properties must be applied to Butyl rubber as well as to any other rubber insulation.

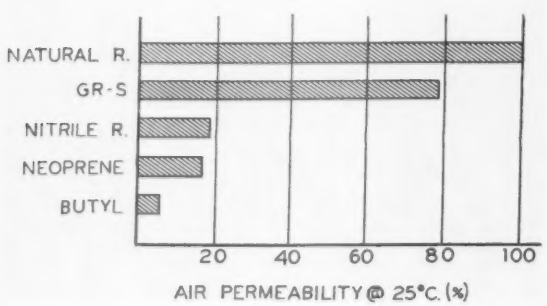


FIG. 1—Permeability of different types of polymers to air at 25° C.

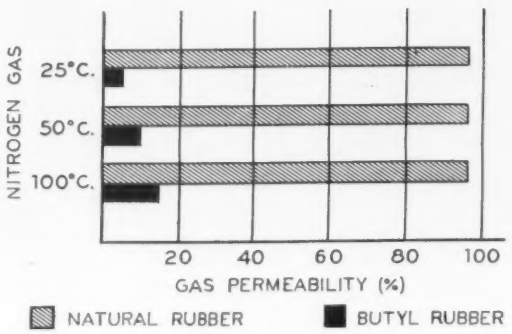


FIG. 2—Nitrogen gas permeability of natural rubber versus Butyl rubber at 25°, 50° and 100° C.

Curing Systems

With regard to curing systems for Butyl insulations, the quinone-red lead vulcanizing agents are most widely used since they give the best electrical properties against present specifications. Here again there is a great difference in the properties and handling of these agents as compared to organic accelerators used in natural rubber or GR-S.

The quinones used, GMF and Dibenzo GMF, have no definite melting points; only their decomposition temperatures are listed. Since organic accelerators are definite chemical compounds they have very definite melting points in direct contrast to the quinone compounds. There is a point, many degrees above the melting point of organic accelerators, which gives a softening point or plastic effect to aid dispersion. Such is not the case with the quinones or red lead.

To overcome this particular property with these vulcanizing agents (quinone or red lead), masterbatching

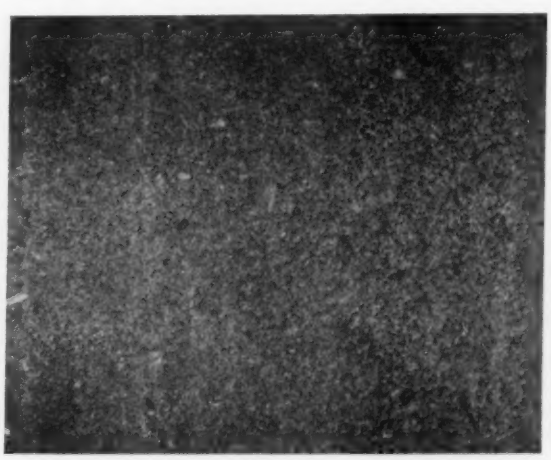


FIG. 3 — Photomicrograph of unvulcanized Butyl base stock with no vulcanizing agents added

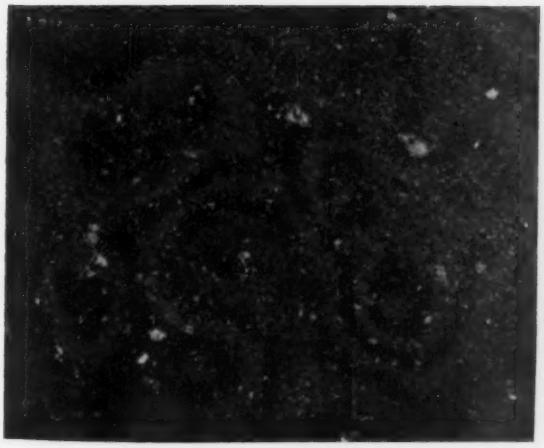


FIG. 4—Photomicrograph of a vulcanized high voltage insulation compound. Black particles are GMF.

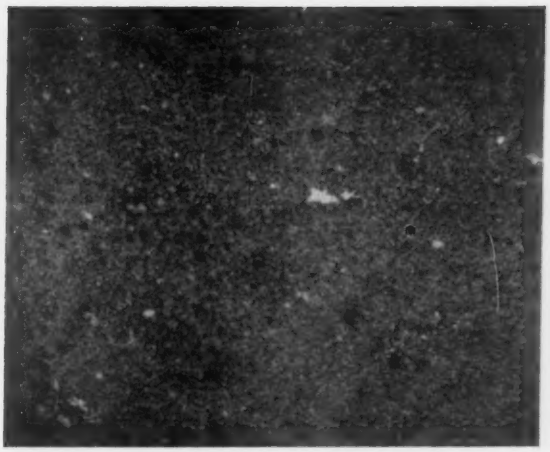


FIG. 5—Photomicrograph of a Butyl insulation compound showing poor dispersion of red lead.

has been recommended. These materials are mixed in high concentrate masterbatches, using two parts of the vulcanizing agents with one part of Butyl polymer. This method has given good results in many cases.

However, there are good and substantial reasons why it is now necessary to amend or change the procedure just outlined. These reasons are emphasized in Figures 4 and 5.

Figure 4 is a photomicrograph (50X) of a vulcanized high voltage Butyl rubber insulation compound which failed on certain voltage tests. Note the black specks which were first adjudged as agglomerates of carbon black. Some of these black particles were dislodged and a qualitative examination revealed them to be GMF. This GMF was masterbatched in Butyl and added to the base stock on a rubber mill preparatory to extrusion. A few more tests revealed the Mooney on the base stock to be 30-35 and that of the masterbatch to be 60-65. In order to use this masterbatch it should be softened with additional plasticizer to bring the resultant Mooney closer in range to the Mooney of the base stock. Figure 5 shows red lead mixed under the same masterbatching conditions and once again poor dispersion is evident.

As a result of this evidence, we are currently recommending the use of the commercial dispersions of such fine electrical vulcanizing agents as GMF, Dibenzo GMF and red lead. These dispersions are known as "Ken-Mixes" and are available from the Kenrich Corporation, Maspeth, New York. They are highly dispersed in a good electrical plasticizer and their use overcomes the dispersion problem. When these dispersions are used, some of the softener should be removed from the base stock to correct for the total amount of plasticizer used.

It is not our intention to advocate that photomicrographs be made of every batch of Butyl rubber mixed, but it is suggested that in developmental work the chemist take an occasional look under a microscope to ascertain whether good dispersion is being secured.

Reclaiming Butyl Rubber

By GEORGE A. BARCLAY

Xylos Rubber Division, Firestone Tire & Rubber Co., Akron, Ohio

THERE are many articles made from Butyl rubber. For various reasons some of these articles will find their way into a reclaimer's plant and it then becomes his problem to reclaim this scrap into a workable reclaim.

At the present time Butyl tubes are used as the main scrap since they have been a high volume item. The Butyl tubes are reclaimed under exacting manufacturing specifications with the use of very small amounts of reclaiming oils. The final Butyl reclaim has a low Mooney plasticity, high rubber hydrocarbon, and excellent workability.

One of the main difficulties presented in reclaiming Butyl scrap is avoiding contamination by other types of rubber scrap. It is necessary to completely examine every lot of Butyl scrap for this contamination. This examination is carried out by various types of tests such as a rebound test or an odor test of a burnt sample. We have trained people to recognize Butyl by these tests, but it entails a considerable amount of work. The simplest method is the examination for the blue line on the Butyl tubes. The reclaimers would appreciate having all Butyl parts marked in such a manner. Along this line it is also necessary to examine for patches on the Butyl tube as these represent a possible contamination.

The reason for this careful separation of the incoming scrap is that as small as 1 to 5% of contamination by other types of natural or synthetic rubber will cause very poor cures, as shown by low tensiles obtained. A possible explanation for this effect is that natural or synthetic rubbers have a greater affinity for the curatives thus causing the Butyl reclaim not to cure. Along this line the users of Butyl reclaim have been cautioned to store it in a separate place away from other reclaims. The mixing of Butyl reclaim with other types of reclaim in the customer's plant will result in these same poor cures.

TABLE I—TYPICAL BUTYL RECLAIM COMPOUND

(Cure: 20 mins. @ 320°F.)

Butyl reclaim	182.0
Zinc oxide	5.0
Sulfur	2.0
Methyl Tuads	1.0
Captax	0.5

Butyl reclaim represents a completely mixed formula with the pigments completely dispersed. This reclaim accepts pigments readily. For some products it is only necessary to add the curatives. Thus, a batch can be mixed in only a few minutes. If it is desired to mix Butyl reclaim with new Butyl rubber the former will aid in the acceptance of pigments such as carbon black, thus reducing the mixing time. The nerve of a Butyl reclaim compound is much less than that of a new Butyl compound. By using Butyl reclaim a better smoothness is obtained. For this reason it is widely used in calendering and tubing applications.

Butyl reclaim requires more acceleration (usually of the ultra type) than used for other types of reclaim. One explanation for this is that Butyl originally has a low unsaturation. Some of this unsaturation was used up in the original cure (before reclaiming). After reclaiming less unsaturation is available for the cross-linking by sulfur. When Butyl reclaim is used with new Butyl rubber no greater amounts of curatives are necessary than would be used in an all new Butyl formula. Use of Butyl reclaim with new Butyl rubber will enable the compounder to reduce the total plasticizer, carbon black, and other fillers in a compound in proportion to their amount in the reclaim.

Some of the accelerators that may be used for curing Butyl reclaim are Methyl Tuads, Captax, Ethyl Selenac, Polyac, and many more. These accelerators are used in conjunction with 5 parts of zinc oxide and 2 parts of sulfur based on 100 RHC. Butyl reclaim when tested in the Rubber Reclaimers Association compound (see table) will give tensiles of 1000 to 1500 psi with an elongation of 500 to 600% and a Shore A hardness of approximately 50. The compound also indicates one of the combinations used for curing Butyl reclaim.

Several types of Butyl reclaim made by different methods and addition of pigments are available. They differ in properties and are made for various end usages in Butyl tubes, hose, and mechanical goods. The type of Butyl reclaim to be used depends on the compound and the properties desired in the finished product. Permeability of Butyl compounds is not affected to any large degree by the addition of Butyl reclaim.

Another possible use for Butyl reclaim is in cements and dispersions. In cement work the aromatic solvents such as toluene seem to be the best while the hydrogenated solvents such as Talloc or Apco No. 1 are second best. Cements with total solids of 10 to 25%, depending on viscosity required, can be made.

Butyl Rubber in Mechanical Molded Goods

By WILLIAM H. KING

Acushnet Process Co., New Bedford, Mass.

BUTYL rubber, a general-purpose synthetic elastomer, possesses a low degree of chemical unsaturation and offers many outstanding properties which make it of interest in the field of mechanical molded goods. The outstanding properties exhibited by this interesting copolymer are:

Low Price: Butyl rubber is one of the lowest priced elastomers available to the rubber industry today.

Low Gas Permeability: Butyl offers excellent resistance to the diffusion of gases.

Good Heat Resistance: In order to properly evaluate Butyl rubber compounds on a laboratory basis it was necessary to increase aging temperatures from 158° to 212° F. and even to 250° F.

Good Weather Resistance: Oxygen and ozone have long been arch enemies of natural rubber and some synthetic elastomers. Butyl, because of its low degree of chemical unsaturation, offers good resistance to the deteriorating effects of both of these gases.

Good Flex Resistance: The flex life of Butyl rubber compares very favorably with that of natural rubber in ordinary applications but is superior in certain critical applications.

Good Chemical Resistance: Butyl offers good resistance to most acids, alkalis and salt solutions. It also exhibits the characteristic of low water absorption, of importance in many applications.

Good Animal and Vegetable Oil Resistance: Butyl is superior to natural rubber or GR-S.

Good Tear Resistance: Butyl is similar to natural rubber in this respect. Tear resistance is improved by reinforcing pigments.

Good Electrical Properties: Butyl is a saturated polymer free from electrolytes. Good properties are retained even after immersion in boiling water.

Good Banbury Mixing Characteristics: Butyl does not require breakdown. Pigments are added immediately, good dispersion results and batches are relatively safe processing.

Good Molding Characteristics: Stocks flow and knit well and, after cure, exhibit good hot tear properties which facilitate stripping in many instances.

Good Physical Properties: Pure gum compounds exhibit good physical properties similar to natural rubber and neoprene. Very low loadings of reinforcing blacks result in highest tensile properties. Colored stocks can now be compounded which will offer physical properties similar in many respects to carbon black reinforced compounds.

Good Non-Staining Properties: There are now five grades of non-staining Butyl rubber being marketed.

Examples of Applications

This copolymer is being used for such applications as bellows, boots, bumpers, conveyor belts, diaphragms, gaskets, grommets, hose, inner tubes, insulation, O-rings, shims, stoppers, tank linings, tubes, vibration dampeners and weatherstrips. It is also worthy of mention that combinations of these properties can be had in the same stock

without sacrificing other desirable properties. In other words, Butyl rubber offers extraordinary properties as plus values to the compounder in the field of mechanical molded goods.

One problem that has been confronting the rubber industry for years is the necessity of improving products exposed to atmospheric conditions, especially black or colored products made from general-purpose elastomers. In most instances, these products must not only be weather resistant but they must also be flex resistant or heat resistant or cold resistant or non-staining. The specifying of this additional requirement presents problems in many instances if the base polymer is not Butyl rubber.

To illustrate the good aging properties of Butyl, an olive drab Butyl gas mask that was cured in April, 1941, and aged for fourteen years on the roof of our plant, was just tested and the Shore A durometer was found to be 42, the tensile 2120 psi and the elongation 700%. Similar masks, when tested for physical properties in 1941, had a Shore A durometer of 45, tensile of 2500 psi and an elongation of 900%. In addition to having good retention of physical properties, this Butyl mask was found to be free of the usual checking and cracking which is so characteristic of the parts made from other general-purpose elastomers subjected to the same test for much shorter periods of time.

In using Butyl rubber, two problems are presented. One is that of its susceptibility to contamination by other materials such as natural rubber or other synthetic rubbers having a high degree of unsaturation. The slightest contamination results in a poor or non-curing stock. Even unsaturated compounding ingredients must be avoided. This problem is not insurmountable, and by adopting good housekeeping practices it can be eliminated or, at least, kept to a very minimum.

The second problem is that of resilience. Butyl rubber products do not exhibit the usual snap so characteristic of natural rubber; thus, there has been some sales resistance toward the acceptance of products made from this polymer. This problem, however, is not as serious today as in the past.

The Properties of Brominated Butyl Rubber

By CARL H. LUFTER

B. F. Goodrich Chemical Co., Avon Lake, Ohio

BROMINATED butyl is a chemically modified form of Butyl rubber available commercially as Hycar 2202. It is produced by the incorporation of 1 to 3.5% bromine by weight on the polymer chain. The bromine probably enters the polymer by both substitution and addition. Brominated butyl is unique first of all in being one of only two commercial polymers produced by using another commercial polymer as a starting point. It is unique secondly because some of the traditional difficulties encountered with Butyl give promise of being eliminated by its use. For example, Butyl traditionally has a slow cure rate; it has an aversion for other polymers which demands extraordinary care in avoiding polymer contamination, and adhesion of Butyl to most other substances has always been a problem. It is felt that brominated butyl may solve many problems which now make use of the valuable Butyl polymer difficult or impossible in a number of applications.

Brominated butyl is compounded in the same manner as Butyl with the exception that more latitude in the use of softeners or resins is available, the presence of other polymers does not retard or inhibit the cure, and reduced accelerator levels are usually indicated. The use of quinoid type cures tends to give a slightly scorchy stock and a 25 percent reduction of the quinone phase plus the use of the dibenzo variation is recommended. Shown (see table) are several cure systems which have been found to be successful.

Brominated butyl may be mill-mixed in the same manner as Butyl rubber. In the case of Banbury mixing, the increased cure activity of brominated butyl requires that the curing ingredients and metallic oxides be added on the sheet-off mill to avoid scorch.

The cure rate of brominated butyl is such that the time to reach a given cure level is ½ to ⅓ that required with Butyl at equal accelerator levels. This has been shown by Mooney scorch curves where the brominated butyl attained a 30 point Mooney increase in one-third the time required for Butyl and a polymer blend of 50 parts of Butyl and 50 parts of brominated butyl more than halved the cure time found with Butyl alone. Brominated butyl vulcanizates, generally speaking, show lower tensile strength, lower elongation, and higher modulus than comparable Butyl rubber vulcanizates, along with no tendency toward reversion on overcure.

The unusual cure properties of brominated butyl may be explained in part at least by the dual cure mechanism which exists. A small amount of unsaturation is present and it is through this system that sulfur vulcanization takes place. At the same time it is apparent that vulcanization also occurs due to the interaction of the bromine in the polymer and heavy metal oxides in the compound.

Brominated butyl may be blended with natural rubber and GR-S with good polymer compatibility. Cure systems similar to those customarily used with GR-S and natural rubber have produced satisfactory vulcanizates of the blends. Although natural rubber blends appear to have better cure characteristics than GR-S blends, both polymers when blended with brominated butyl result in vulcanizates with improved ozone resistance. The ozone resistance of the blends increases rapidly as the ratio of brominated butyl to GR-S or natural rubber increases above the 50/50 level, and at a ratio of 70/30 the blend approaches a maximum ozone resistance level. For ex-

CURE SYSTEMS FOR BROMINATED BUTYL

	(1)	(2)	(3)
Sulfur	2.00	2.00	1.50
Benzothiazyl disulfide	1.00	.25	—
DOTG	.10	—	—
TMTD	—	.50	—
p,p'-dibenzoyl quinone dioxime	—	—	4.00
Red lead	—	—	7.00

ample, a blend of 70 parts of brominated butyl in a compound with 30 parts of natural rubber showed no cracks in a stressed specimen after 214 hours' exposure to a 25 pphm ozone concentration.

The compatibility of brominated butyl with other polymers provides an excellent means of solving the difficult problems associated with the adhesion of Butyl to other materials. Adhesion of Butyl to GR-S or natural rubber can be accomplished by applying a brominated butyl cement to the surfaces of the Butyl compound and the GR-S or natural rubber compound and then curing the cemented surfaces together. The most successful cement for the adhesion of Butyl to other polymers has been found to be a simple 10 percent heptane cement of brominated butyl reinforced with 40 parts of EPC black. Using this system, adhesion of Butyl to natural rubber has reached values of 75 pounds per inch and adhesion to GR-S has been found to be 25 pounds per inch.

Improved adhesion has been obtained through the substitution of a tie gum or tie coat for the cement. In this case, adhesion of Butyl to natural rubber at room temperature has been greater than 95 pounds per inch and at 212° F. the Butyl-to-rubber adhesion reached 66 pounds per inch, at which level the canvas backing on the test samples failed. Using the tie coat technique the adhesion of Butyl to GR-S was 56 pounds per inch at room temperature and 23 pounds per inch at 212° F.

Excellent adhesion of Butyl to aluminum, brass and steel can be obtained by the use of a brominated butyl cement. Preparation of the metal surface should follow the usual procedure of sand or grit blasting and degreasing and this should then be followed with a prime coat of resorcinol-formaldehyde resin. A thin film of brominated butyl cement should be applied to both the Butyl and the metal surfaces. The cement recommended is that made from a brominated butyl-EPC black mill mix. After curing the assembly of Butyl and metal, adhesion values greater than 75 pounds per inch have been obtained at room temperature. Values greater than 68 pounds per inch have been obtained at 212° F. against aluminum, brass, and steel.

Brominated butyl, because of its increased cure rate, would seem to offer considerable promise for electrical insulation applications. It has been found that when brominated butyl is put in an insulation recipe, aging, low temperature flexibility, ozone resistance, power factor, SIC, insulation resistance, and dielectric strength all are about equivalent to an electrical grade of Butyl. A word of caution is that the water resistance of brominated butyl vulcanizates, although excellent in comparison with most polymers, is not as good as the exceptional water resistance obtainable with Butyl rubber vulcanizates.

Butyl vulcanizates have good resistance to high temperature aging. Comparisons of brominated butyl vulcanizates to regular Butyl vulcanizates have shown that in general resistance of brominated butyl to high temperature aging is equal and sometimes superior to comparable Butyl compounds. An advantage of brominated butyl becomes evident when certain vulcanizates are aged in air at 350° F. Under these conditions some Butyl cures revert so badly as to make determination of physical properties impossible. The quinoid cures have not shown this reversion tendency and with such systems little difference between the aging properties of Butyl and brominated butyl has been found.

Brominated butyl vulcanizates retain many of the excellent properties of Butyl such as ozone resistance, good low temperature brittleness, low air diffusion, electrical insulation characteristics, and good aging resistance. In addition, brominated butyl eliminates several undesirable characteristics of regular Butyl which have limited the application of this polymer. Brominated butyl provides a faster cure rate, affords compatibility with a number of elastomers, and gives excellent adhesion to metals and other polymers.

Questions and Answers

Wire and Cable Extrusions

(Answers by E. W. Schwartz)

Question—What effect has calcined magnesia on cure, aging and moisture absorption of Butyl rubber vulcanizates?

Answer: In the quinone-red lead curing system, metallic oxides, such as calcined magnesia, will have a mild retardation effect on the cure. In open steam cures, alkaline materials, whether amines or some of the metallic oxides, retard, while the acidic materials accelerate the cures in the quinone vulcanizing system. Much, of course, depends on how much calcined magnesia is used. If much over 2% on the Butyl polymer is used, it can raise the moisture absorption, especially if good dispersion of the oxide has not been obtained.

The aging of the compound will not be greatly changed by small additions of this oxide, provided there is a correction for the retardation effect of the cure. It seems that before hot mixing of Butyl insulations was adopted, calcined magnesia was used to eliminate porosity and surface blistering. It was a natural consequence, inasmuch as the older rubber-factice combinations, using such things as oyster shell lime or calcined magnesia along with litharge, were used to overcome porosity. With new mixing procedures, calcined magnesia certainly is not needed.

Question—What is the effect of sulfur content on the cure, aging and stability of Butyl compounds?

Answer: This question must of necessity be divided into two parts. In the organic acceleration system of curing Butyl polymers, tetramethyl thiuram disulfide is used with a co-accelerator like mercaptobenzothiazole. Here, 1 to 2 parts of sulfur on the polymer can be used. This combination, properly vulcanized, will stand a 96 hour oxygen aging test or a 7 day heat oven test at 95° C. In air bomb tests run at 250° F. (125° C.) it is best to cut sulfur considerably and work with selenium and tellurium derivatives of dithiocarbamic acid. These derivatives are more dispersable than the sulfur vulcanizing substitutes, metallic selenium or tellurium.

With GMF, Altax and red lead, 1.5% to 2% of sulfur will accelerate the cure and increase the tensile. However, the air bomb tests are not as good as with only token amounts of free sulfur below one-half of 1%. The water absorption of over 1% of sulfur in this system is definitely increased and electrical stability is poor. Such is not the case with the Dibenzo GMF system in combination with red lead only. Here, 1 to 1.5% of sulfur must be used to obtain an adequate cure and good physical properties. The water absorption or stability is not affected with this amount of sulfur and the aging, specifically air bomb results, is excellent. Thiazyl disul-

fide used with Dibenzo GMF, red lead and sulfur causes poor aging and poor electrical stability.

Question—What will prevent the distortion of Butyl rubber compounds after insulation and during the vulcanization process?

Answer: The best way to cure Butyl insulation compounds is in continuous vulcanizing equipment. Since the quinone-red lead system with Polymer 035 is slow, it is difficult to cure in pans or on drums and prevent distortion. However, all is not lost. Increased additions of pre-reacted Polyac will stiffen the stock sufficiently to cure in pans, provided a good panning job is done and not too many layers are used and each layer is covered with clean talc or soapstone. The talc or soapstone must be new to keep away rubber or GR-S particles, grease, sulfur and organic accelerator contamination.

In heavier cables, considerable protection against distortion is obtained by using cable tapes wrapped on the cable in tandem with a tubing machine and then reeled on a drum. The same rules apply here as in all rubber cables. Tensions must be watched and the diameter of the drum must be large enough so that the underneath layer of the cable against the drum is not too tightly bent.

Very large, heavy walls of Butyl insulation have been vulcanized in lead sheath and the lead stripped off after the cure. This is the same procedure used in high quality dredge mining machine or shovel cables.

It is my understanding that there soon will be available extrusion machines connected with continuous vulcanizing tubes which will extrude this type of insulation downward which will make good Butyl cable with a minimum of distortion.

Question—How can Butyl rubber be extruded with a fairly smooth surface? What are the best extruder barrel, worm and die temperatures for Butyl?

Answer: These questions must be divided into two classifications, as the procedure in extruding Butyl can be either cold or hot. Cold feeding of the stock calls for longer barrels and worms so the stock can be worked a bit and acquire the necessary plasticity before entering the head. The temperatures in either type of extrusion in the tuber is of a much lower order than that used for other polymers. As an example, the barrel temperature should be about 130° F., the head temperature 160° F. and the die temperature 160 to 175° F. The worm must be of double flight, shallow design to obtain the most uniform feed, whether cold or hot feed. There is a further limitation here in that hot-mixed Butyl compounds extrude best since they are soft but dense. To obtain smooth surface, a good rule to follow is to select a die about 15% smaller in size than the over-all diameter of the extrusion. In a 500,000 CM cable, maximum swelling is 20 mils, which, when based on the wall of rubber, is about 15%.

Question—What precautions are necessary in mixing or processing Butyl rubber on equipment used interchangeably with GR-S?

Answer: Contamination of Butyl rubber with either natural rubber or GR-S must be avoided. As little as 1% of a GR-S compound contaminated with Butyl will have a marked effect on the cure. The Banbury must be thoroughly cleaned and if smoked sheets or GR-S are used to clean it, these materials must be entirely free from the rotors, packing glands and gate. The mill rolls must be clean also. The guides must be clear and the pan under the mill rolls must be very clean. Sulfur dust and accelerator particles must be entirely eliminated. Very often there is a surface scum on mill rolls which cannot be cleaned with the so-called cleaning batches of rubber. Here the mill rolls must be cool and scrubbed with solvent to remove this scum.

Question—If one were having difficulty in obtaining stability of insulation resistance at 75° C., would you say probably the best place to make corrections would be in compounding?

Answer: The chances are it is not in the compounding. The compound in an RH-W stock is a simple one. On 100 parts of Polymer 035 use 5 parts of a good zinc oxide and 5 to 10 parts of an FT black to get best heat aging results. The balance could contain Whitetex No. 2 along with paraffin, a good grade of electrical plasticizer and perhaps some sun-check wax.

I would like to suggest some answers by asking, in turn, some questions: (1) Did you hot mix your base stock? (2) Is your base stock dispersed? (3) What system of quinone acceleration are you using? If it is GMF-Altax-red lead, are you using high sulfur to get higher physicals or faster cures? (4) Have you looked under the microscope to see if your accelerators are really dispersed? (5) Have you a good tight cure or are you encountering porosity? If your cure is porous, try curing the insulation after it comes off the CV cure for about seven days at 70° C. See if that makes a difference and if it does, correct this condition.

This is a tough specification to meet. It is not so much what you put in your compound, but how you put your ingredients together, and this includes the vulcanization process.

Question—In sulfur-thiuram cures in black Butyl jacket stocks, what can be done to improve the slow recovery from deformation as demonstrated by digging the finger nail into the stock?

Answer: Black Butyl jacket stocks first appeared in certain government stocks for airplane usage involving low temperature flexibility at —65° F. Since then, there has been some usage for corona-resistant stocks calling for Butyl jackets. The question, as stated, does not mention any co-accelerator used with sulfur-thiuram cures. If no co-accelerator has been used, then this definitely accounts for the slow recovery from deformation. Try mercaptobenzothiazole with thiuram. If this is a bit scorchy, substitute benzothiazyldisulfide. If this still does not satisfy the requirements, use some other Butyl polymer than the one most commonly used in the wire field, namely, Polymer 035. This will give a Butyl compound with a higher percent mole unsaturation which, in turn, will give tighter and faster cures.

Question—What is the future of Butyl rubber in wire compounds?

Answer: The use of Butyl rubber in the high voltage field is definitely increasing and looks exceedingly good. Butyl gives good aging, good heat resistance and a very high order of insulation resistance. If you couple or connect all these properties with the excellent corona resistance of Butyl rubber, you have a very saleable combination.

Of course, mistakes have been made. Companies in their desire to make these premium wire and cables quickly, have neglected to study some very fundamental

factors. For severe conditions, such factors as corona level, long-time stability tests in both wet and dry environment, Schering bridge measurements at different voltage levels to measure dielectric losses and, what is more important, field experience and application engineering, have been lacking. This is the way with new developments. The over-all picture of Butyl in high voltage cables has actually been good.

With regard to the low voltage field, the question might be asked why must we make 300-volt and 600-volt wire and cable with Butyl polymer when natural rubber or GR-S might be adequate? Technically, there are some sound reasons for considering the use of Butyl rubber for such applications.

Did you know that in certain areas of the west and southwest 600-volt building wire and feeder cables made of natural rubber and GR-S in conduits and ducts have had to be pulled out at great expense because the surface of the insulation was cracked? Some of these wires have only been installed for a year. These failures are certainly not electrical in nature, not at 600 volts maximum operating conditions. It is perhaps a combination of conditions and some high ozone concentration in the local atmosphere. Here, Butyl RH-W has given an excellent account of itself thus far.

As new Butyl polymers are developed the fundamental knowledge of compounding is increased and field experience is broadened. Since Butyl rubber is a good electrical polymer, its future in the wire field looks bright indeed.

Question—What Butyl polymer should be used when compounding a wire and cable insulation requiring both maximum ozone and maximum heat resisting properties?

Answer: In order to obtain the best ozone resistance coupled with the maximum heat resistance it is best to use Polymer 035 with the quinone-red lead curing system.

Question—On electrical wires, how can corrosion of the tinned or alloy-coated copper conductor under the Butyl insulation best be avoided or minimized?

Answer: In using GMF and red lead without sulfur, or very small amounts of it, there is less tendency for the so-called corrosion effect. However, in the Dibenzo GMF system where 1 or 1.5 parts of sulfur are used, it is best to use pure tin coatings. As a matter of fact, there is a difference of opinion on this corrosion effect. The alloy coatings are softer on the surface than pure tin, and the adhesion of Butyl compounds is so great that in stripping the rubber from the conductor a minute layer of the alloy coating is pulled off with the rubber. This gives the corrosion effect with the usual discolorations. The safest procedure is to use pure tin coatings on these wires and cables, while in the Dibenzo GMF system lower sulfur should be used to correct this condition.

Question—How can corona resistance and high voltage fatigue be improved in Butyl insulations on electrical wires?

Answer: The best corona resistance of any rubber compound, whether it be Butyl or not, is obtained by controlling modulus. In general, it can be said that for any one given Butyl insulation at a definite ozone concentration, the lower the modulus the longer will this insulation last without cracking. There are many unvulcanized rubber compounds which are quite corona resistant because there is very little stress and the ozone does not attack under these conditions. This, however, is not practical. There are many technologists who will disagree with this statement because they feel that Butyl rubber is very corona resistant at any given modulus.

High voltage fatigue has been given considerable study of late with regard to Butyl insulations. The choice of carbon blacks in this connection is most important. Channel blacks, with their surface oxygen, when hot mixed or given the thermal treatment, form cross-links to help increase voltage breakdown considerably. When the furnace blacks are used, with such promoters as Polyac or other oxygen carriers, the same type of difficulty may result.

Butyl rubber is significant in that up to 30 parts of carbon black on 100 parts of polymer can be used without seriously affecting insulation resistance, provided the black is well dispersed. The limitations of the amount of channel or furnace black used are dependent upon the following: (1) The heat resistance and air bomb aging of channel and furnace blacks is not as good as the thermal blacks, and (2) The dielectric constant and power factor of high voltage compounds are increased by excessive usage of these blacks. Of course, the most important issue is the power factor. Here again it is not the original value that counts but the percent increase of the original value under applied voltage or under conditions of such tests as the IPCEA stability tests.

The practical insulation compound must have a balance to meet all phases of any one given specification. Blends of channel, furnace, and thermal blacks are being used from 15 to 18 parts on 100 parts of polymer with good electrical stability and aging results.

Again, it is not entirely compounding. Many fairly heavy walls of cable run on continuous cure equipment apparently are not cured to optimum state. In many cases a long dry heat cure at 250° F. will greatly improve the resistance to voltage breakdown.

To sum up the situation, you have a specification to meet which involves many electrical factors, such as voltage breakdown, which by compounding alone and by using the best blacks for the purpose may increase the modulus at the expense of corona resistance and perhaps even deteriorate heat aging results. For instance, I have recently seen cables which had excellent electrical properties but did not retain 80 to 90% of their original elongation in the 20-hour air bomb test because of the type and amount of carbon black used.

Question—In electrical wire compounds, what physical aging or electrical properties are improved and what properties are depreciated by hot mixing Butyl insulation as against cold mixing?

Answer: The temperature at which mixing takes place in an internal mixer should be governed by how good a job is done in dispersion and getting rid of entrapped gases and moisture. This should also control the time in mixing. We would definitely recommend the elimination of an internal mixer recording chart on temperature as the sole guide in temperature, as experience has taught us two very important facts: (1) These recording charts, connected to a bulb in the mixer, give only a very small percentage of contact of the entire mass of base stock. The difference between chart and actual stock readings can be from 50° to 100° F. Very often these recording charts have not been recalibrated since the installation of the mixer. (2) A surface pyrometer on the sheeting

mill or a needle point long arm pyrometer will give much more accurate results, provided, of course, that these instruments are properly calibrated.

By experience, we know that actual stock temperatures of 300° to 350° F. give good results. We must caution, however, that where the internal mixer charts showed these temperatures, the actual temperature was well over 400° F. and since the stock was in the mixer some 20 to 25 minutes, the resultant stock, while dense and well dispersed, gave smooth extrusion but was deficient in tensile strength. There was no sulfur added in the mixer in order to obtain low water absorption, good electrical stability and the minimum of corrosion on the conductor. Where 1 to 1.5% of sulfur is used this may not happen as far as degradation of the base stock is concerned. This, then, is the only specific observation made on differences between temperatures used in mixing.

We assume cold mix to mean the normal mixing as used in insulation compounds with other polymers. If you add the various fillers under these conditions directly into the mixer, you will not get suitable dispersion or a dense, gas and moisture-free stock. To those who insist on a cold mix because of factory insistence or limitation of equipment this can be done by preparing high concentrate masterbatches of each ingredient used in the base stock and then blending them together. Even here the Mooney plastometer readings of the various masterbatches must not be too far divergent in order to obtain a suitable final blend. We do not consider this method practical and it will increase the cost.

As to aging or electrical properties, these are connected with the following considerations: (1) Good dispersion of base stock giving dense and gas and moisture-free extrusions; (2) A high degree of dispersion of accelerators including red lead; (3) State of cure, and (4) Choice of carbon blacks used in the base compound. These four considerations stand by themselves and, therefore, the aging and electrical properties are not connected directly with either hot or cold mixes.

Question—What are the peculiar effects of Polyac in Butyl insulating compounds and what is the recommended procedure for its addition?

Answer: Here are some of the peculiar effects of Polyac in Butyl insulating compounds:

(1) Polyac (polyparanitrosobenzene) will react with the Butyl polymer forming cross-links which tend to stiffen the mixes. This, some feel, aids dispersion in the Banbury base stock mix.

(2) At temperatures roughly above 270° F., Polyac reacts with the Butyl polymer without the aid of other accelerators to create this cross-linkage with an exothermic effect. Usually, the temperature of the stock in the Banbury rises very rapidly until the reaction is complete.

(3) The Mooney plasticity of Polyac pre-reacted Butyl stock is much higher than stock without this chemical.

(4) Where Polyac is pre-reacted, temperature control above 270° F. must be certain, for if any free Polyac is left in the stock, scorch will occur on the sheeting mill or in the extruder. Experimentally, a stock prepared with Polymer 035, which is the slowest curing polymer, can be vulcanized in 1 to 2 minutes in a laboratory press at 300° F. This stock need contain only about 0.10 to 0.15% of Polyac on the rubber to get this cure, but the incorporation of this accelerator as free Polyac must be done on refrigerated rolls. It would be impossible to extrude this compound without scorch.

(5) Where larger amounts of Polyac are used, say from 0.4 to 0.5% on the polymer, the modulus is increased and the elongation decreased on the vulcanizate.

(6) Pre-reacted Polyac Butyl stocks are more difficult to extrude because of the increased plasticity.

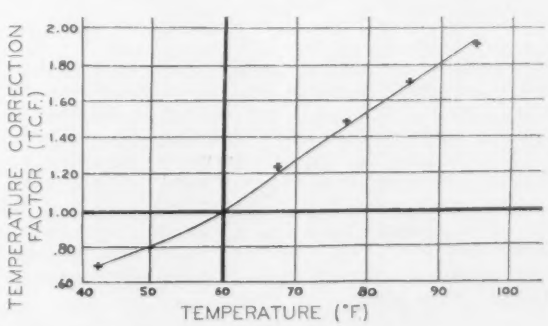
(7) There is a great difference of opinion as to the best procedure for incorporating the Polyac. The newest type of Polyac, the active chemical dispersed in wax, disperses very readily at the beginning of the Banbury cycle and will begin action in this dispersed state when proper temperature is reached. This is important because it eliminates "localized" spots.

(8) Polyac will serve as an oxygen carrier in carbon blacks which are low or deficient in surface oxygen. In this case it is known as a "promoter" and serves a most useful purpose in the furnace or thermal blacks as against channel blacks which carry surface oxygen.

Question—The insulation resistance of Butyl rubber compounds decreases with increasing temperature. Does this follow the general trend? Does the correction factor curve follow a straight line or is there a changing trend at more elevated temperatures?

Answer: Yes, Butyl polymer insulations do follow the general trend of all rubber insulations in that insulation resistance decreases with increasing temperatures. In reply to the second part of the question, the temperature correction factor above 60° F. (15.5° C.) is, to all intensive purposes, a straight line. Below 60° F. there is a slight bend in the curve. For this part of the curve, the minus correction factors below 60° F. is fairly typical of many other polymers.

Just a word as to how the temperature correction curve is determined. A well selected piece of wire, usually of smaller diameter sizes, that has shown good electrical characteristics, is lead sheathed with a thin layer of the metal. This is to eliminate all factors of error based on water absorption. The leaded wire is cut into two separate lengths, usually about 25 feet each, and immersed in a water bath with a very sensitive thermostatic control in order to get close tolerance in the water temperatures. The wire is kept at selected temperatures at 5° to 10° F. variations for several hours and at each selected temperature to make sure that the entire mass of wire immersed is at constant temperature. Readings of insulation resistance are then taken on a high sensitivity laboratory bridge. The other length is kept in a separate bath for temperatures below 60° F. and readings are taken in the same manner. The temperature correction factor curve of a typical high voltage Butyl cable compound is shown in the accompanying chart.



Temperature correction factor curve of a typical high voltage Butyl cable compound.

Brominated Butyl

(Answers by C. H. Lufter)

Question—Has there been developed a suitable cement for cementing two pieces of Butyl rubber together?

Answer: Assuming that the question refers to adhering two pieces of cured Butyl, the answer would be that it is difficult to formulate an adhesive to give good bond strength under such conditions. A fair bond may be obtained using Butyl reclaim, brominated butyl, or even natural rubber in the presence of heat and pressure. Satisfactory adhesion of uncured Butyl to uncured Butyl can usually be accomplished using a Butyl cement made from a composition similar to the Butyl compound being cemented.

Question—Is it possible to blend Butyl with another polymer?

Answer: Efforts to blend Butyl rubber with other polymers have usually failed because of the unsatisfactory cure which results from these Butyl blends. Successful blends with neoprene have been reported and blends of Butyl with brominated butyl present no problem. Some success has been had with three way blends of Butyl, brominated butyl and natural rubber or GR-S. Brominated butyl may be blended in all proportions with GR-S, natural rubber or Hypalon. There have been recent reports in the literature of successful blends of Butyl with other polymers accomplished by the use of selected cure systems.

Question—What is the best cement for adhering cured and/or uncured Butyl to metal? What is the effectiveness of these adhesives at 250° F.?

Answer: Excellent adhesion of Butyl to metal can be obtained by using a simple 10% hexane cement of brominated butyl reinforced with 40 parts of EPC black. When such a cement is used between a prime coat of resorcinol or phenol formaldehyde resin and the Butyl compound, adhesive strengths of greater than 75 lbs./inch can be obtained. Adhesion of these bonds at 250° F. have exceeded the capacity of the test instrument and were recorded as being greater than 68 lbs./inch. These tests were run with uncured Butyl that was vulcanized in place against aluminum, steel, or brass.

Question—What are the electrical characteristics of brominated butyl?

Answer: The electrical characteristics of brominated butyl are good. A recent publication has shown that when brominated butyl is compounded in a typical insulation recipe it is equivalent to the best electrical grade of Butyl in power factor, SIC, insulation resistance, and dielectric strength. It should be pointed out that the mechanical water absorption of brominated butyl is greater than that of Butyl rubber, which has an extremely low water absorption. This increased water sensitivity may alter electrical characteristics obtained after extended periods in the presence of water.

Question—What are the moisture absorption characteristics of brominated butyl?

Answer: The water absorption characteristics of brominated butyl are good by most standards, but the swell of brominated butyl compounds in water is several times that of Butyl rubber, which has an exceptionally low water absorption. A recipe which gives a volume change in water of 0.5% with Butyl will give about 4% with brominated butyl.

Mechanical Goods

(Answers by W. H. King)

Question—What is the effect of adding neoprene (in compatible proportions) on the cure rate, processability and properties of Butyl rubber?

Answer: The addition of neoprene to Butyl in compatible proportions has been recommended as a means of minimizing the softening of Butyl compounds exposed to extreme heat or steam service. Limited work conducted at Acushnet indicates the addition of 2½ to 5 parts of neoprene does not have any great influence on either cure rate or processability of the stocks evaluated to date. Our work is incomplete at this time and the relative merits of this compounding technique are still under investigation.

Question—What is the optimum compound temperature for minimum swelling and shrinkage of Butyl extrusions?

Answer: Butyl, because of its inherent nerve, does not lend itself to smooth extrusions exhibiting minimum and maximum swelling characteristics, particularly in the pure gum state. Usually, the addition of 20 volumes of carbon black or 30 volumes of mineral fillers are required for good extrusion characteristics and the addition of reclaim and small percentages of petrolatum and/or process oils facilitates this operation. The optimum compound temperature for good extrusions will vary with each compound and extruder and this temperature will have to be determined on each compound, we believe, on a trial and error basis. Normally, extrusions are carried out at temperatures varying from 200° to 270° F. We might also add that extrusion rates of Butyl compounds differ from those of natural rubber or GR-S. Butyl normally extrudes at a slower rate.

Question—What is the shrinkage of Butyl compounds during vulcanization?

Answer: Generally speaking, Butyl compounds will exhibit slightly lower shrinkage during vulcanization than similar natural rubber or GR-S compounds. As with natural rubber and GR-S, the shrinkage will be influenced by the dimensions and geometry of the part in question as well as the stock preparation, compounding ingredients and time and temperature of cure.

Question—What are the general recommendations for compounding and processing Butyl rubber as compared with GR-S?

Answer: Butyl rubber is vulcanized in much the same manner as GR-S in that it requires sulfur, an accelerator and zinc oxide. The sulfur level in Butyl is usually 1.5 to 2.5 parts per 100 parts of polymer with 2 parts of sulfur being the general practice. This sulfur level can be a combination of elemental sulfur and an organic sulfide marketed under the trade name of "Sulfasan R," in

equal proportions. This practice will eliminate objectionable sulfur bloom in the vulcanized stock. Due to the limited amount of unsaturation in Butyl, there are fewer locations for potential cross-linkage and more active accelerators and higher temperatures are required to obtain desirable vulcanizates in reasonable cure times. Primary accelerators in concentrations of 1 to 2 parts per 100 parts of polymer are usually thiuram sulfide or dithiocarbamate types.

Secondary accelerators in concentrations of .25 to 1 part per 100 parts of polymer are used to increase cure rate and can be selected from the thiazole, guanidine or aldehydeamine types. Unlike GR-S, Butyl vulcanizates exhibit good physical properties without fillers or reinforcing agents. The addition of carbon black does not improve tensile strength. However, it does increase modulus and tear resistance, with channel and furnace blacks being more effective. Similar reinforcement can be obtained in colored stocks by the addition of calcium carbonate, clay, hydrated silica, titanium dioxide and zinc oxide.

Colored Butyl stocks have a tendency to stick to mill rolls and, if this is found to be a problem, the addition of 1 to 5 parts of BXDC (Butoxyethyldiglycol carbonate) will facilitate handling. Plasticizers for Butyl must be saturated materials such as hydrocarbon oils, aromatic esters and metal salts of fatty acids, usually 2 to 5 parts being adequate for good processing characteristics. For applications involving good low temperature flexibility, 10 to 20 parts of an ester type plasticizer is recommended. Similar to GR-S, Butyl can be processed on standard rubber equipment according to conventional methods.

Question—Under certain conditions a plied-up sheet which looks very good on the calender will develop large blisters between plies after standing for several days. Is this caused by trapped air or some other reason?

Answer: This could be trapped air and also could be caused by lack of proper pressure contact during the calendering operation. This problem is more acute with Butyl and caution should be exercised in such processing operations.

Question—What is the weather resistance of Butyl compared with neoprene, Paracril, etc.?

Answer: Assuming that all the polymers were compounded for the ultimate in weather resistance, we believe silicone rubber, Hypalon, Hycar PA-21, Poly-FBA, neoprene and Butyl could all offer good weather aging characteristics superior to natural rubber, GR-S and the nitrile rubbers. The selection of any of the above polymers for a weather-resistant application would be dependent primarily on the other requirements that the application must fulfill.

Question—Will the addition of low percentages of Butyl rubber to a GR-S compound improve the ozone resistance of the GR-S compound?

Answer: While the addition of low percentages of Butyl rubber might improve the ozone resistance of a GR-S compound, we think that any improvement would be very slight. We question this compounding technique and think a better approach might be the addition of antiozidants and wax or, possibly, blending with brominated butyl.

Question—In Banbury mixing of Butyl compounds, give a typical mixing cycle including total mixing time and temperatures which could be expected during this cycle.

Answer: We are endeavoring to mix our Butyl batches at optimum temperatures consistent with practical procedures and normally start our Banbury cycle on Butyl rubber compounds at temperatures of 150°F. maximum. The circulating water is turned off and the sequence of operations is as follows:

(1) Add Butyl and one-half of filler and zinc oxide—seven minutes.

(2) Add balance of filler, accelerators and processing aids—five minutes.

(3) Add oils or plasticizers—three minutes.

(4) Drop batch and add curative on mill.

Water is turned on during the mixing cycle when the temperature reaches 235°F. We endeavor to have the drop temperature of our Butyl batches approximately 235° to 250°F. Sulfur is added on the drop mill and stock is cut and blended, this operation taking approximately four minutes.

Butyl Reclaim

(Answers by G. Barclay)

Question—Can Butyl reclaim be blended with rubber?

Answer: There are times when a mixture of Butyl reclaim with other rubbers would fulfill a purpose. On blends containing 50% of a Butyl reclaim and 50% of a natural rubber reclaim, a tensile is obtained approximately one-third of the calculated tensile from cures containing 100% of each reclaim. The best results are obtained by the use of 1.5 to 2.5 parts of sulfur along with 1 to 1.5 parts of a mild accelerator such as Altax or Santocure. There are probably other combinations of curing ingredients; however, the resulting compound will have a low tensile value.

From the data we have obtained, it appears that mixtures of 1 to 5% of natural rubber into Butyl reclaim will cause a considerable decrease in tensiles and may result in spongy cures. Increasing the percentage of natural in the Butyl reclaim with proper curatives will still give low tensile figures but without spongy cures.

Question—What is the future availability of Butyl reclaim?

Answer: The desirability of the tubeless tire on automobiles has cut the use of Butyl tubes and, consequently, the amount of the main scrap for Butyl reclaim. For the immediate future, most reclaimers have enough scrap to furnish requirements with the present grades of Butyl reclaim. Beyond this, the availability of Butyl reclaim will depend on the use of crude Butyl in various other products since part of these products will eventually end in the reclaimer's yard. Providing enough volume is obtained from these parts a good Butyl reclaim can be made. If these Butyl parts could be marked in such a way as to recognize them at sight it would greatly help the reclaimers in furnishing a good Butyl reclaim. An example of this marking would be the blue line on Butyl tubes.

As the reclaim is controlled to some degree by the scrap used, this new reclaim may be slightly different in analysis from the present types of Butyl reclaim. However, we feel sure it will give the same easy processing as present in the current Butyl reclaims.

Question—Does Butyl reclaim improve processability, mixing, calendering and extruding?

Answer: It has been our experience that compounds using Butyl reclaim process quicker and require less mixing time than those compounds using all new Butyl. This is due to the reclaiming process where the Mooney and the smoothness are controlled. Also remember the plasticizing oils, carbon black and fillers already mixed into the Butyl reclaim in a completely dispersed form necessitate only the time required for addition of curatives.

Further, due to the reclaiming process the "nerve" or the tendency of a compound to shrink is greatly reduced. For this reason compounds using Butyl reclaim in the proper formulations will calender and extrude faster and smoother than a similar compound using all new Butyl.

Substitution of Butyl reclaim for all or part of the RHC into formulas now using new Butyl rubber will result in easier processing. Smoother stock will be obtained than that using all new Butyl. On this substitution it will be necessary to take into account the oils, carbon black, fillers and RHC values present in the Butyl reclaim.

General Questions

(Answers by R. M. Thomas)

Question—What are the optimum and the maximum safe temperatures for hot mixing Butyl compounds?

Answer: The temperatures employed in hot mixing Butyl compounds vary somewhat depending upon the filler used but in general are within the range of 350° to 400°F. In no case should they be over 450°F. Carbon black compositions require 15 to 20 minutes for the mix whereas Hi-Sil or clays require only 10 to 12 minutes. In either case, the temperature of the final mix where accelerator is added should be kept down to about 200° to 220°F.

Question—What factors, besides heat, influence the reversion (depolymerization) of Butyl rubber on extended aging?

Answer: The factors involved include the type of Butyl used, the number and type of cross-links produced by vulcanization, the presence of chemical agents such as oxygen, ozone or hydrogen sulfide, the presence of ultraviolet light, X-rays, gamma rays, etc., together with other conditions which might be involved, such as tension or flexing of the rubber during service. The best simple answer is to avoid excess sulfur and accelerator in the vulcanizate.

Question—Can or should Butyl compounds be reinforced with high styrene resins?

Answer: On the basis of limited experience, it appears that true reinforcement of Butyl with high styrene resins is not obtained, although there is an increase in hardness with sacrifice in elasticity.

Question—Has Butyl rubber ever been produced commercially as a synthetic latex or as a water-dispersed suspension? If so, what products have been made and by what methods?

Answer: The U.S. Rubber Company produces an aqueous dispersion of Butyl known as Dispersite, which has a high solids content and a high viscosity. It is believed to be made by inversion, adding water to Butyl containing a minimum of filler with considerable ammonia and casein. It is used in adhesives. During the war, the Pioneer Rubber and Latex Co. produced a water dispersion of Butyl under government contract for an undisclosed use. At present, Esso Research and Engineering is preparing Butyl latex on an experimental basis by a different technique which is very promising, particularly in tire cord dipping. It is hoped that this latex will soon be brought to a commercial stage.

Question—What is being done to improve curing times of Butyl rubber?

Answer: This question deals with an important problem which is being worked on intensively. Improvement in curing times for Butyl rubber is being sought by (1) research on vulcanization at high temperatures, (2) development of better compounding techniques, (3) investigation of new curing systems, and (4) modification of the present types of polymers.

Question—What property in the Butyl rubber structure is responsible for its good heat aging?

Answer: No one property is responsible for the good heat aging of Butyl rubber. Absence of excess double bonds, presence of a sufficient number of cross-links and low permeability, particularly to oxygen, are important factors.

Question—What effect would an increase in Banbury rotor speed (from 20 to 30 rpm's) have on the processing of Butyl rubber compounds?

Answer: An increase in Banbury rotor speed would result in faster and hotter mixing with improved dispersion. Temperature control is aided by starting at speeds up to 40 rpm and then dropping back.

Miscellaneous Questions

(Answers by Enjay Co., Inc.)

Question—What are the recommendations for making a high gum Butyl non-blooming, non-tacky, light-colored compound?

Answer: For a non-blooming compound use: (1) a high degree of bound sulfur, (2) a minimum amount of sulfur, and (3) a readily dispersed sulfur, such as Spider brand, with or without Sulfasan R. For reduction of tack use magnesium oxide and heat treatment.

Question—Has anyone a tip on how to get maximum tensile from pure gum Butyl stocks? How high is this tensile?

Answer: For maximum tensile, Butyl grade 035 or 150 should be used. A cure system composed of zinc oxide, Tuads and sulfur is also suggested. With grades 035 and 150, a tensile of 3500 psi can be attained. Use of grade 218 results in a tensile of about 2400 psi. Pure gum stocks tend to have poor tear resistance, thus making tensile data difficult to obtain. Usually a loading of 10 volume percent carbon black phr is employed for test purposes.

Question—What types and percentage of carbon black give the best abrasion resistance?

Answer: Channel blacks used to the extent of 35 to 50 phr give the best abrasion resistance. Forty parts of SAF black with 15 parts of oil are satisfactory.

Question—What effect does water, soapstone, soap solution, and zinc stearate have on Butyl compounds prior to curing?

Answer: None of these materials affect Butyl compounds prior to curing. Soapstone may cause mold sticking upon curing. The zinc stearate is absorbed by the polymer and is a good lubricant. The soap solution should give good mold release.

Question—How is maximum ozone resistance obtained in a Butyl rubber vulcanizate?

Answer: Maximum ozone resistance is obtained in a Butyl vulcanizate by (1) a high state of cure, (2) low polymer unsaturation, (3) a Tuads-Captax-Sulfasan R-sulfur cure system, (4) a good sulfur dispersion, and (5) low carbon black loadings using furnace and thermal blacks.

Question—In sulfur-thiuram cures on black Butyl jacket stocks, what can be done to improve the slow recovery from deformation as demonstrated by digging the fingernail into the stock?

Answer: A higher state of cure would improve this as would heat treatment. The use of Polyac in the cure system may also be an aid.

Question—What is the best way to combine Butyl with either polyethylene or PVC?

Answer: For polyethylene blending the following procedure is recommended: (1) masticate the Butyl rubber, (2) add polyethylene to the Butyl above 320° F. and make a masterbatch containing 30% polyethylene, and (3) take an aliquot of Step 2 and blend to desired level.

Question—What effect does thermal interaction have on the physical properties of a compound when using clay loadings instead of carbon black?

Answer: Heat treatment results in increased tensile strength, modulus and resilience, and reduced stiffness, permanent set and extrudibility.

Question—What is the compatibility and what are the properties of polyethylene-Butyl rubber mixtures?

Answer: High polyethylene mixtures when poorly mixed tend to be granular on extrusion and blowing. When properly mixed, as previously outlined, this condition is not exhibited.

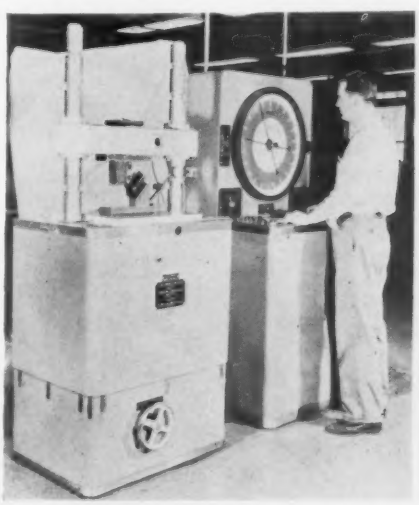
Automation Simplifies Testing of Rubber Engine Mounts

AUTOMATION came to the laboratory of a leading automobile manufacturer in Detroit with the introduction of an all-electric testing machine which automatically cycles tension and compression loads. The operator can now divide his attention among several types of tests or finish his test reports while the machine is operating.

In the test, a rear engine mount for a truck engine goes through a series of four load cycles in which it is deflected 3/16 inch three times in compression for conditioning the rubber and then subjected to a load of 500 pounds the fourth time load is applied. This cycle test is followed by a shear test in another position with three deflections of 0.5 inch and then application of a load of 500 pounds. The specimen is strained and relieved at the rate of ⅛ inch per minute which extends the time for both tests to about an hour.

Tests of this type have been greatly simplified by installation of a Baldwin SR-4 testing machine of 50,000 pounds capacity built by the Baldwin-Lima-Hamilton Corp., Philadelphia, Penna. Loading is measured and controlled by Baldwin SR-4 load cells which are based on the electrical principle of the SR-4 bonded resistance wire strain gage. Strain cycles are controlled by limit switches on platen movement. These switches reverse the direction of the electric motor drive of the machine, the actual movement being read on a dial indicator in thousandths of an inch. Strain readings are taken at 250- and 500-pound loads during the fourth cycle. Load measurements are made on the lowest of four scales (0 to 1000 pounds) which has 2-pound graduations on a 66-inch scale.

Tests of rubber mounts, as well as many other tests made on this machine, have three purposes: to check new shipments to various plants, to check samples for source approval, and as a quality control. Similar tests are conducted on rubber hose for the cooling system, brake hose, and power steering hydraulic hose. Various plastics and fiber-reinforced plastics that have been proposed and submitted for body, fenders, and instrument panels have been subjected to tensile tests.



Four automatically cycled test loads to condition rubber engine mounts before measuring deflection under load simplify the testing of these automotive parts.

Korbet Treatment Improves Mold Release and Reduces Cleaning

THE cleaning off of hydrocarbon buildups on rubber molds between heats or every few heats is one of the necessary evils in the production of rubber goods. The developers of a new chemical process claim that the costly cleaning on many steel molds can now be eliminated. Further, they claim that the application of this process has made it possible to sharply reduce downtime since work on molds between use which formerly required hours can now be done in a matter of minutes or may not be required at all. Known as the Korbet Process, it was developed by the Korbet Corporation, 877 Addison Road, Cleveland 3, Ohio.

According to Korbet engineers, the use of the Korbet Process on molds reduces troublesome buildup by absorbing the lubricant in cavity surfaces. This assures that ridges, ribs, grooves and embossed surfaces of the molded products are sharply maintained and clearly defined for many heats. It was also found that the treatment by sealing the pores of mold cavities retards the pickup of rubber and other foreign materials. Extensive tests further indicated that the process had long wearing ability so that retreatment is seldom, if ever, required. The treatment is applied at the company's plant.

In evaluating the process, various shapes and sizes of rubber items were molded. In molding a recoil pad, steering column grommet and insulating strip (Figure 1) the problem of frequent mold cleaning was found. In producing the recoil pad, which contains high grade rubber, rejects were found to be high due to the fact that the T slots on the end filled up and were not clearly defined. The molds used in vulcanizing the steering column grommet (containing reclaimed rubber) were constantly filling up with hydrocarbons and required cleaning every shift. In molding the insulating strips, containing medium grade rubber, this same problem of frequent cleaning was found.

After treating these molds with the company's process it was found that in the case of the mold used for vulcanizing the recoil pad that mold release was greatly improved with the T slots remaining sharp and clean. The manufacturer of these recoil pads reported that thousands of the parts have been made without a single reject. Lubricant saving was also achieved.

The molds used in vulcanizing the steering column grommet have been in production for six months without cleaning, according to the company, while the molds used for the insulating strip (Figure 2) have been in production for two months without cleaning. In addition to reducing the cleaning, the treatment is said to have decreased the number of defective parts. Further, very little or no lubrication has been required.

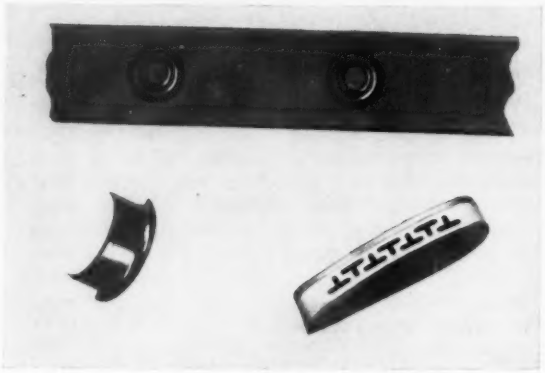


Figure 1

In still another case, the company treated a mold used for producing large grommets. Prior to the treatment, the three ears in this mold filled up rapidly resulting in rather poor production. After treatment, however, better flow, improved release and fewer rejects were achieved. The treated mold is shown in Figure 3.

The company reports that the treatment saves many hours of downtime by preventing the vulcanized material from adhering to the molds On many molds it is no longer necessary to spend hours removing all the foreign deposits left during molding operations. Pieces are said to be released in an ideal state. Ridges, ribs, grooves, embossed surfaces, lettering knurled points, sharp edges and fine lines and letters in a pattern are said to remain clean and unaltered for many heats.

Since cleaning of molds is said to be eliminated or reduced by the process, heat losses during the loading and unloading operation are minimized. It is believed by technologists that the temperature drop of a mold during the unloading and loading cycle results in sources of variation in the physical properties of the resulting vulcanizates. It is reported that the Korbet Process, by reducing or eliminating mold cleaning and spraying, shortens the time required to return the mold to platen temperature.

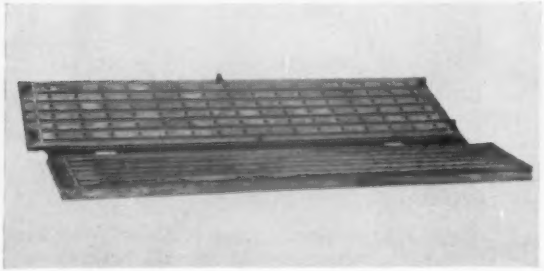


Figure 2

Figure 3

How Goodyear Gets Better Performance from Its Battery-Powered Industrial Trucks

IN 39 YEARS of using battery-powered industrial trucks, the Goodyear Tire & Rubber Company has developed a material handling organization, equipment and techniques of wide interest and application.

To select, maintain and operate 111 electric rider-type and 128 electric floor trucks, seven straight gas trucks, 17 gas-electric trucks, 184 batteries, and 27 highway trucks, plus 38,000 pieces of material handling equipment, on a six-hour, four-shift-per-day-basis, Fred L. Coburn, manager of transportation for all three Akron plants, has organized his department around 32 foremen and supervisors who direct repair mechanics, dispatchers plus 300 industrial truck operators. Only one man per shift (at each plant) is required to charge the batteries and one man on the day-time shift only for battery maintenance. A supervisor controls the battery room plus the maintenance and repair of the industrial trucks.

FIG. 1—Goodyear developed this 4000 pound double platform lift truck for transporting raw tread stock from the rubber mills to the tire machines. Each skid holds 2000 pounds.

Special Equipment

A double-platform lift-truck was developed in 1939 at Goodyear to handle skids of raw tread stock. There are now 11 of these trucks in operation which pick up two skids separately, each containing 2000 pounds, and carry them simultaneously and put them down separately (Figure 1). Four thousand pounds on one skid caused the layers to stick together. In addition, there is greater flexibility in supplying stock to the tire machines with two 2000 pound skids than one 4000 pound load.

Large rolls of rayon cord are handled with a Goodyear-designed fork-lift attachment. The tip is made of bronze formed to a thin but not sharp edge, with two rollers placed close to the edge. The rolls can be picked up without damage.

Rubber-impregnated fabric is delivered in 1550 pound rolls 63 inches high. A truck with a full 360° revolving clamp is used so that the rolls can be stored in a vertical position to save room but can be laid on the floor horizontally prior to being placed in the feeding rack (Figure 2).

Battery Charging Room

There is one centralized battery charging, maintenance and repair area placed on an enclosed bridge connecting two principal production buildings. Goodyear has stan-

FIG. 2—A truck with a full revolving lifting clamp permits storing rolls of rubber-impregnated fabric weighing 1500 pounds and standing 63 inches high vertically in order to save space.

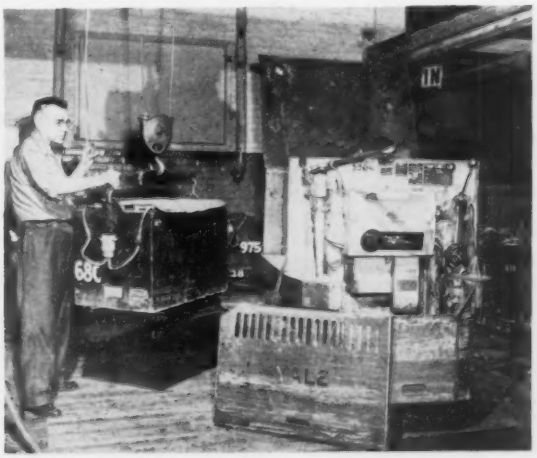


FIG. 3—Bridge-mounted hoist reaches all parts of battery charging room. The rubber sheet placed on top of the battery prevents accidental sparking if the bar should come in contact with the terminals.

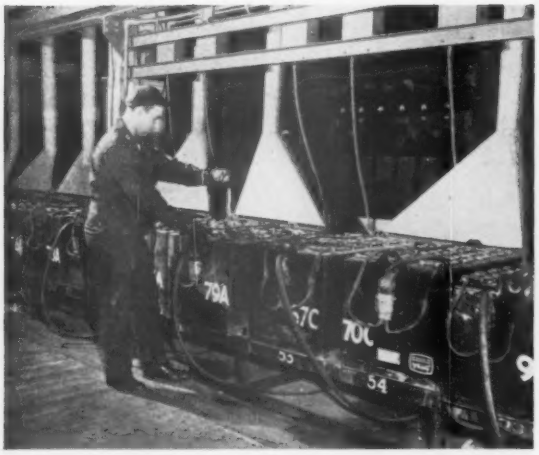


FIG. 4—The specific gravity of each battery is checked and recorded before and after charging. Water is added when required from a still within the battery shop. Note position of the racks.

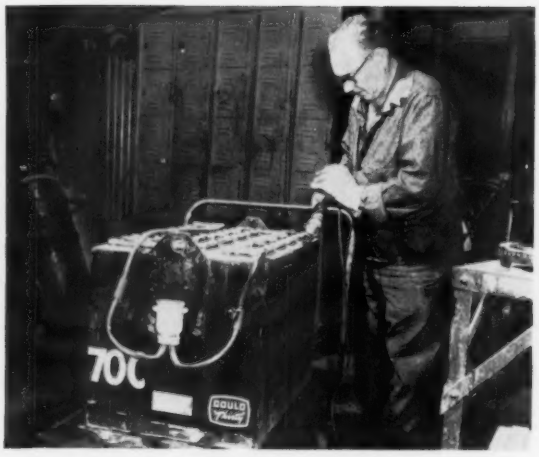


FIG. 5—Prompt repair of damage with a knife, sealing compound and an electric hand iron adds to the battery life. The batteries are washed frequently and are inspected for minor damage and small leaks.

dardized on the 15-cell, 17-plate, 480 ampere-hour battery (Gould XEZ-17) for all rider-type trucks to achieve complete interchangeability. This also makes charging easier. Considerable flexibility and the operation of charging equipment at high efficiency is obtained with one 8-circuit unit, three 6-circuit units, three 2-circuit units and eight single-circuit units, all of the motor-generator type.

Batteries for the floor trucks have also been standardized around the 6-cell unit—53 have 11 plates and 36 have 19 plates.

Battery Handling

Batteries are handled by a bridge-hoist reaching all parts of the shop (Figure 3). A rubber sheet is placed over the top of the battery to prevent accidental sparking should the steel spreader bar come in contact with the terminals.

Batteries are cleaned with steam and soda and flushed with water every two weeks to remove dirt and expose possible damage. This is done in a separate compartment adjoining the charging room.

The specific gravity of each battery is recorded before and after charging (Figure 4). Electrolyte lost because of evaporation is replaced by distilled water from a still within the shop. Note that the battery racks bring the tops of the batteries to the proper working height and provide space underneath for ventilation. Note also the air ducts which blow air over the tops of the batteries to reduce their temperature while charging.

Not only are batteries washed frequently but they are inspected for minor damage and small leaks. A crack or cut found in the battery top is repaired at once with a knife, sealing compound and an electric hand iron to achieve the smooth surface required (Figure 5).

The batteries at Goodyear are delivering top performance under a very heavy-duty schedule. Operating on a four-hour shift, 24 hours per day service requires a well organized battery handling and service routine. The excellent battery performance obtained is due to a large degree to the well organized maintenance procedure.

Birtcher Electrical Foot Switch

A new circumference actuated electrical foot switch has been developed by the Birtcher Corp., 4371 Valley Blvd., Los Angeles 32, Calif. The switch is said to make positive contact no matter where it is pushed. It can also be activated with hand, elbow, or knee, whichever is most convenient for the operator. It is suited for precise, involved, or dangerous manufacturing processes, where it is necessary that the worker have both hands free. Two switches may also be placed in series, for applications where the worker's safety requires that his hands be kept away from a machine when it is operating. Originally developed for use with electro-medical-surgical equipment, the switch operates on 110 volts, 10 amperes, and measures 3-3/16 inches in diameter and 1¼ inches in height. The outer shell is molded bakelite, with a non-skid rubber base. Both switch and cord are approved by Underwriters Laboratories. They are available either stripped or with a variety of plugs, according to the manufacturer.

Fawick Timing Rotorseal

The Fawick Airflex Division, Fawick Corp., 9919 Clinton Road, Cleveland 11, Ohio, has announced the development of a new, dual-purpose timing rotorseal for industrial presses. Compact in design and size, the unit is completely self-contained and sealed, protecting the electrical circuit and timing mechanism from dirt and oil. By combining two functions into one mechanism, the need for extra shaft space formerly occupied by cam limit switch, sprockets, timing chain and complicated mountings is said to be eliminated. Timing of the operating cycle is accomplished by multiple limit switches which control air pressures to the clutch and brake. The design of the timing rotorseal provides for 360° adjustment (clockwise or counterclockwise) of the flat of the cams with respect to a point on the crankshaft. The setting is made through the use of a knurled knob which extends from the housing. Indexed arrow markings on the face provide a handy guide for the setting of the knob.

Editorials . . .

Educational Planning

ONE of the major subdivisions of the Mechanical Division of the Rubber Manufacturers Association is launched on a very ambitious program—one which merits the full support of every manufacturer of molded, extruded, lathe cut and chemically blown sponge rubber goods. The program is generally referred to as the "cooperative educational program" and some of the objectives in view were clearly defined at a meeting of the subdivision held at Hot Springs, Virginia, late last month, as outlined elsewhere in this issue.

Specifically, the subdivision is attempting to establish standards of performance for finished rubber products. Coupled with this is the necessity for conveying the information to purchasers of the products themselves. To accomplish the latter objective, the group is thinking in terms of a brochure which would outline the characteristics of the products involved and establish the standards of performance. A substantial start has already been made toward this objective and working committees are already functioning.

No one knows better the multitudinous problems involved in this venture than the members of the RMA subdivision who are tackling the problem. Just imagine a brochure which would clearly spell out standards of rubber products to design engineers, quality control men and purchasing agents in the automotive, refrigerator, electronic, food, and the other one hundred and one industries served by rubber manufacturers! And remember, the standards must be acceptable not only to the purchasers of these rubber products, but to the rubber manufacturers who produce them.

Space does not permit a thorough discussion of the program, but it should be obvious that it is a comprehensive one which, if accomplished, will prove of immeasurable value to the over-all rubber manufacturing industry. Therefore, it merits the active support of all manufacturers and such support is welcomed from both RMA member and non-member companies. Full details will gladly be supplied by J. J. Catterall, Rubber Manufacturers Association, 444 Madison Ave., New York 22, N. Y., or H. C. Dinmore, Tyer Rubber Co., Andover, Mass. The latter is chairman of the Cooperative Educational Committee. Now, indeed, is the time for all rubber manufacturers to come to the aid of the party!

Shipments to Red China

THE recent decision of the British Government approving the shipment of natural rubber from Malaya and Singapore to Red China has had few repercussions. It has caused various officials of the U. S. State Department to do some soul searching to determine what our official position should be insofar as our embargo policy is concerned, but unless we missed it no official statement has been forthcoming from Washington. Actually, this "break" in the policy has been in the wind for some time and caught no one with complete surprise.

The decision on the part of the British Government, which was long urged by major shippers of natural rubber in Malaya, was somewhat forced by the decision of the Indonesian Government to follow in the footsteps of Ceylon and open her rubber wares to Red China. For several years now, Ceylon, a member of the British Commonwealth, has been shipping rubber to Red China in exchange for rice. In addition, Russia and several of her satellite nations have been able to purchase rubber on the open market and could divert some of this rubber to China if the need were critical. Accordingly, the British decision, although somewhat distasteful to our State Department, was logical.

It is quite likely that the subject of shipments of natural rubber from Malaya and Singapore to Red China was included among the discussions held earlier this year between England's Eden and America's Eisenhower. It is no secret that the British were urging a general relaxation of the embargo policy. It is even possible that the British got a little tired of our "study" of the over-all situation and decided to take matters into their own hands. Ergo, the recent decision where rubber is concerned.

In a sense, only "face" is involved in the decision since no great quantities of natural rubber are at stake. Red China imported approximately 32,000 long tons of rubber in 1955 as against world imports of some 1,875,000 long tons. Even if Red China's imports were doubled or tripled this year or next they would not greatly affect the supply situation, despite the fact that production of natural rubber this year is expected to be slightly under consumption requirements. Malaya certainly deserves some consideration, especially in view of the recent drop in rubber prices.

Highlights Sidelights *of the News . . .*

July, 1956

The House of Representatives has rejected a proposal to sell the government-owned alcohol-butadiene plant at Louisville, Ky., to the Union Carbide and Carbon Corp. of New York City . . . A bill subsequently introduced to permit the sale of the plant for the manufacture of any defense-vital chemical instead of limiting its future use to synthetic rubber production was tabled by the Armed Services Committee . . . Unless another sale is negotiated and approved by Congress, Publicker Industries, the present operator, will continue to run the plant until the expiration of its lease in April, 1958 (page 647).

Final arguments in the suit brought by the B. F. Goodrich Co. against the U. S. Rubber Co. for alleged infringement of a tubeless tire patent were heard in Federal District Court in Baltimore, Md., on June 29 . . . The presiding justice has announced that his decision on the matter will be rendered on July 27 (page 651).

Meetings of interest held during the past few weeks include the June 18th meeting of the ASME Rubber and Plastics Division at Cleveland (page 648) . . . the Seventh Annual Plastics Exposition sponsored by the Society of the Plastics Industry at the Coliseum in New York City (page 650) . . . the Annual Meeting of Committee D-11 on Rubber and Rubberlike Materials of ASTM at Atlantic City (page 656) . . . and the Annual Meeting of the Molded, Extruded, Lathe Cut and Chemically-Blown Sponge Rubber Subdivision of the RMA at Hot Springs, Va. (page 662).

The U. S. Department of Justice has announced the indictment of six rubber companies on charges of illegal price fixing in the sale and distribution of industrial rubber belts . . . The indictment, handed down by a Federal Grand Jury in Denver, names as defendants Goodrich, Goodyear, U.S. Rubber, Gates Rubber, Dayton Rubber and Boston Woven Hose & Rubber . . . The indictment charges that these companies unlawfully conspired to fix uniform list prices, rates of discounts, terms and other conditions for the sale of V-belts (page 651).

The Management Committee of the International Rubber Study Group, after an examination of the world statistical position, estimates that world production of natural rubber in 1956 will total 1,835,000 long tons . . . It is estimated that world production of synthetic rubber will approximate 1,250,000 long tons . . . The IRSG figures indicate a balance in the world supply-demand position for natural rubber and a relatively small excess supply of synthetic rubber (page 647)

NEWS REPORTS and Industry Activities

HOUSE DISAPPROVES BUTADIENE PLANT SALE; REJECTS UNION CARBIDE'S $3,125,000 OFFER

THE House of Representatives, on June 19, rejected a proposal to sell the government-owned alcohol-butadiene plant at Louisville, Ky., to the Union Carbide and Carbon Corp. of New York, N. Y., for $3,125,000. The House action followed a recommendation of its Armed Services Committee which, at a meeting on June 13, voted against the sale by 22 to 1. The Rubber Producing Facilities Disposal Commission had announced the successful negotiation of a contract with Union Carbide on May 17. The terms of the contract called for a purchase price of $3,125,000 if Union Carbide took the facility subject to an existing lease with Publicker Industries, Inc., the present operator. If Union Carbide took title in April, 1958, when the Publicker lease expires, the purchase price would have been $3,500,000. The Disposal Commission announcement of May 17 prompted a controversy in that the Attorney General did not approve the sale. It was stated that the Attorney General did not object to the sale as a violation of the anti-trust laws. Rather, he held that the sale to Union Carbide would not foster competition. Further, the projected sale raised the likelihood that Publicker Industries, the only producer of alcohol-butadiene, would thus be eliminated.

In its action of June 19, the House adopted a resolution of disapproval without a record vote after Representative F. Edward Hebert (Dem., La.) said the Armed Services Committee felt it must recommend against the sale in view of the position taken by Attorney General Brownell. The committee quoted the Attorney General as saying the proposed sale would not best foster the development of a free competitive synthetic rubber industry.

The committee noted that Union Carbide would not commit itself to continue the manufacture of butadiene at the plant except "when and to the extent such operation is economically feasible." The disposal law requires that a purchaser be one who in good faith "intends to operate the facilities for the purpose of manufacturing synthetic rubber or its component materials."

Quotes Comptroller General

The committee also quoted the Comptroller General's Office as saying that in the view of the report by the Attorney General, Union Carbide might not get a clear title under the sale proposed by the Disposal Commission.

On June 20, following the House disapproval of the sale, Representative Carl Vinson (Dem., Ga.), chairman of the House Armed Services Committee, proposed that Congress allow the plant to be sold for the manufacture of any defense-vital chemical instead of limiting its future use to synthetic rubber production.

Mr. Vinson said that "alcohol-butadiene no longer holds the importance in the national defense structure that it did in World War II when we were in desperate need of butadiene from all sources." He set a hearing for the bill on June 21 before the committee noting that the legislation to be considered had been worked out with the cooperation of the Disposal Commission, the Attorney General and the Defense Department. Mr. Vinson said that such a sale "will benefit the government, the taxpayers and the national security."

It is interesting to note that Russell Blandford, counsel to the House Armed Services Committee, has stated that the plant ought to bring "three times as much" if the purchaser can use it for general chemical production.

On June 21, however, the full committee apparently did not concur in the opinions of its chairman, and voted to table the bill proposed by Mr. Vinson. The committee did approve a motion to extend the life of the Rubber Producing Facilities Commission to July 1, 1957. This action must still be voted upon by the full House.

Unless a subsequent sale is negotiated and approved by Congress, Publicker Industries will continue to operate the plant until April, 1958, when the lease it holds from the government expires. During the bidding period for the plant, Publicker had offered a high of $2,400,000 for the facility. When the Disposal Commission announced the sale to Union Carbide for the $3,125,000 figure, Publicker offered to match the offer.

Publicker officials at that time took the position that the Disposal Commission should have accepted their last offer rather than to submit a contract which the Justice Department would not approve. It was revealed that Publicker offered to sign a conditional contract at $3,125,000 to take effect if the Attorney General disapproved the sale to Union Carbide.

Rubber Output in Balance

The Management Committee of the International Rubber Study Group has examined the world statistical position and made estimates for natural and synthetic rubber production and consumption during 1956. It was estimated that the world production of natural rubber would be around 1,835,000 long tons, while production of synthetic rubber in member countries (United States of America, Canada and the Federal Republic of Germany) would be around 1,250,000 long tons.

In regard to consumption, it was estimated that the world might consume 1,845,000 long tons of natural rubber and approximately 1,130,000 long tons of synthetic rubber, apart from the synthetic rubber produced elsewhere. The figures show a balance in the supply-demand position of natural rubber, while it is thought that the relatively small excess supply of synthetic rubber suggested by the figures is likely to be absorbed into stocks, which have been at a low level.

ECI Establishes Scholarship

Announcement has been made by E. K. Stevens, manager of the Exposition of Chemical Industries, New York, N. Y., that the exposition has recently established a 5-year scholarship in chemical engineering at Cornell University. It has also been announced that the 26th Exposition of Chemical Industries will be held at the new Coliseum in New York, December 2 to 6, 1957.

ASME RUBBER AND PLASTICS DIVISION HOLDS MEETING IN CLEVELAND

Three papers on rubber and four papers on plastics featured the June 18th meeting of the Rubber and Plastics Division of the American Society of Mechanical Engineers held at the Hotel Statler in Cleveland, Ohio. The meeting was held in conjunction with the Semi-Annual Meeting of the parent society. The Rubber and Plastics Division meeting was divided into two sessions, one devoted to papers on rubber, and the other to papers on plastics. Dr. Maurice Morton (Akron University) served as general chairman for both technical sessions.

W. K. Taft (Government Laboratories) served as chairman of the rubber session which was held in the afternoon of June 18 with approximately 90 members in attendance. G. L. Bruggemeier (Firestone) served as vice-chairman. The first paper to be presented at the session on rubber was entitled "Properties and Applications of Silicone Rubber" by Silas A. Braley, Jr., of the Dow Corning Corp., Midland, Mich. Mr. Braley stated that silicone rubbers, able to withstand temperatures from —170°F. to +600°F., are making available a long series of practical products heretofore considered impossible.

The speaker pointed out that silicone rubber is also unaffected by weathering and ozone action. This makes it suitable for high altitude service where organic rubbers deteriorate rapidly because of ultraviolet radiation and high ozone concentration. According to the speaker, the heat stability of silicone rubber, combined with its high dielectric properties, has led to its wide use in the electrical industry. Having a higher thermal conductivity than many other insulations, it is highly serviceable for electrical machinery, he said.

Low Temperature Flexibility

Its ability to remain flexible at very low temperatures makes it useful for seals in high altitude aircraft, as well as in refrigerating equipment. Silicone rubber can be cycled from normal temperature to below its freezing point many times with no change in the ultimate physical properties, Mr. Braley pointed out.

The speaker observed that resistance to chemicals and oils varies with the material. Very few materials will stick to silicone rubber, which means that these rubbers perform well as material for rollers and conveyor belts for handling sticky materials such as glues and foods, the speaker observed.

The second paper presented at the rubber session was entitled "The Properties and Applications of Coral Rubber—A *Cis* 1,4 Polyisoprene" by Glen Alliger, J. M. Willis and W. A. Smith of the Firestone Tire & Rubber Co., Akron, Ohio. Mr. Alliger stated that Coral rubber is a high molecular weight polyisoprene having the essential molecular structure of natural rubber and is prepared by lithium catalysis. As a result of this structural similarity, Coral rubber is like natural rubber in its properties. In particular, Coral rubber has the low heat build up (i.e., low hysteretic loss), the good retention of strength at elevated temperatures and the good resistance to tear and cut growth which are characteristic of natural rubber. Coral and natural rubber are similar in their reactivity to sulfur and oxygen. This similarity manifests itself in similar vulcanization and aging characteristics, he observed.

These properties of Coral rubber suggest that it should be suitable for certain tire and non-tire products for which, heretofore, natural rubber has been the only satisfactory elastomer available. On the other hand, the butadiene-styrene copolymer made at 41°F. (cold rubber or LTP) is deficient with respect to some of the above critical properties. These deficiencies make LTP unsatisfactory for certain applications, he stated.

Although Coral and natural rubber are, in general, alike in properties, they are different in certain important respects. Mr. Alliger discussed in some detail the possible effect on end product application of these similarities and differences.

Paper on Polyurethanes

The final paper at the rubber session was entitled "Polyurethane Rubber as a Material of Construction for Industrial Rubber Products" by G. H. Gates and William M. Larson of the Goodyear Tire & Rubber Co., Akron, Ohio. The authors declared that the use of polyurethane in industrial products is only beginning to be appreciated. Polyurethane rubbers have possibilities for use in engineering applications when high tensile, excellent abrasion, oxygen resistance, and high hysteresis loss are required.

The authors discussed applications in such end products as industrial tires, high-pressure pump valve inserts, motor mounts, sponges and foams, etc. It was stressed that while many of these applications are still in the laboratory stage, those articles placed in actual usage look most promising for the future of polyurethane, the authors declared.

The session on plastics was also attended by approximately 90 members who gathered to hear four interesting papers. Selby Skinner (Case Institute) served as chairman of this session assisted by William R. R. Park (Case Institute) as vice-chairman. The first paper at this session was entitled "Weather Aging of Colored Styrene Plastics" by R. J. Bourke, J. R. Taylor and Herbert C. Wood of the Plastics Division, Monsanto Chemical Co., Springfield, Mass.

In this paper, a two-year program on the weather resistance of colored styrene plastics was described. Formulations containing various amounts of typical pigments and dies were studied. The results indicate a beneficial effect from the incorporation of pigments. It was stated that weather resistance improved with increasing concentration of pigment within the range studied.

"Properties and Applications of an Ethylene Polymer" was the title of the second paper presented at the plastics session. As prepared by R. Vernon Jones, Paul J. Boeke and M. W. Davidson of the Phillips Chemical Co., Bartlesville, Okla., this paper contained fundamental data showing the properties of "Marlex 50" ethylene polymer and its relation to polyethylenes in general. The various fields of application of Marlex 50 were discussed, pointing out advantages and disadvantages which may be expected.

Francis L. Ingley and Philip J. Meeks of the Dow Chemical Co., Midland, Mich., presented the next paper at the session, this one entitled "High Impact Plastics as Engineering Materials." This paper offered a review of the mechanical properties of high impact plastics. Engineering factors to be considered in the use of these plastics were discussed.

Discusses Zytel Nylon Resin

"Zytel Nylon Resin—A Versatile Engineering Material" by Watson C. Warriner and A. J. Cheney of the Polychemicals Department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., was the last paper presented at the plastics session. It was stated that all designers utilizing engineering materials are qualified to produce designs in "Zytel" nylon resin. This paper outlined the ready availability of design data, the outstanding and unusual properties of Zytel, and how they can be applied by the practical designer.

Following the presentation of the papers at both the rubber and plastics sessions, Dr. Taft, in his capacity as technical sessions chairman, summarized all the information that had been presented during the day.

MMM Tape Patents Upheld

A Federal judge at Greensboro, N. C., has ruled that patents held by the Minnesota Mining and Manufacturing Co. on a plastic tape were valid, and ordered a number of companies to cease manufacturing and selling similar tapes. The ruling was entered on two cases brought by Minnesota Mining. One of the judgments is against the Noland Co., Inc., of Virginia, and Pine State Electric Supply Co., Scott-Parish Electrical Supply Co., and Dixie Radio Supply Co., all of North Carolina. The other judgment is against Sears, Roebuck & Co., Chicago, Ill., and Plymouth Rubber Co., Inc., of Canton, Mass. The tape involved was described as a vinyl plastic tape which is used primarily for electrical insulation.

Hershberg Products Expanding

A $100,000 expansion program that includes the addition of 5,000 square feet of floor space and the purchase of more heavy rubber machinery has been undertaken by the Hershberg Rubber Products Co., Inc., Ashtabula, Ohio. The larger area will be used in rearranging present equipment and planned new machinery to effect a more efficient operation, Nicholas J. Jammal, president and general manager, stated. A loading dock is also included in the present addition. The company has more than doubled its floor space in the past five years and nearly quadrupled its starting area in 1945. The latest addition will give the company 30,000 square feet of production and office space.

IRI SPONSORS CONFERENCE ON VULCANIZED RUBBER PROPERTIES

Approximately 300 members attended the conference covering the comparative properties of vulcanized rubbers sponsored by the London Section of the Institution of the Rubber Industry on May 11 in London, England. Under the title of "Comparative Properties of Vulcanized Rubbers," the effects of the various polymers on the properties of the finished material were considered, the object being to assist technologists in their choice of basic polymers for the development and production of articles intended for service in particular conditions.

In opening the conference, the chairman, H. C. Baker, explained the difficulty in selecting a title and emphasized that non-vulcanizable materials in their final form would be included in the scope. It was inevitable that some consideration would also have to be given to the conditions of testing.

In the opening paper, L. Mullins discussed the shortcomings of laboratory tests for tear and abrasion resistance and presented data showing the effects of temperature and rate of tearing. The behavior of GR-S and Butyl rubbers was contrasted with that of natural rubber. Arbitrary data obtained from standard abrasion tests was stated to be of little value and recent investigations into the relative contributions of roughness, speed and temperature have provided a clue to their relative importance. That tearing is an important factor in abrasion was demonstrated by comparisons.

High Temperature Behavior

The behavior of various polymers at high temperatures was discussed by E. G. Williams, who emphasized the long term effects resulting from simultaneous oxidative degradation and continued vulcanization. Studies of how the properties change with temperatures show that the temperature coefficient of aging is dependent on the property measured and on degree of aging chosen. Aging curves for various polymer vulcanizates demonstrated the different trends.

R. H. Norman dealt with the chief electrical properties of a range of rubbers and PVC, showing that these properties depend largely upon the degree of purity of polymer used, extent of oxidation and temperature of test. The relationship between chemical type of polymer and dielectric loss in the vulcanizate was discussed and some data on antistatic rubbers given by the author.

S. E. Bolam classified and compared the many types of polymer dispersion or latex now available in this country, indicating the major features of each type of vulcanizable elastomer: GR-S for low cost, neoprenes for flame- and oil-resistance, nitriles for solvent resistance and compatibility with vinyl and phenolic resins. The non-vulcanizable dispersions give low strength products but are useful as films and finishes.

The concluding paper dealt with neoprene and Hypalon. Hypalon is outstanding in resistance to ozone, high temperatures and corrosive chemicals. Neoprene also possesses high stability to many such influences. In a comparison of these two types, J. F. E. Ruffell forecast a big future for them because of their all-round excellence as compared with other elastomers, and indicated the compounded systems required for best results.

Opening the final discussion, G. N. Welding drew a distinction between the first three papers in which the difficulties of assessing a particular property were discussed, with the last two which included excellent summaries of properties and were packed with information of direct value to the technologist.

Like to make a suggestion to the industry? Write a letter to the editor! (See page 564).

KEENER AND KELLY NAMED EXECUTIVE VICE-PRESIDENTS BY GOODRICH

J. W. Keener

Arthur Kelly

Election of J. W. Keener and Arthur Kelly as executive vice-presidents of the B. F. Goodrich Co., Akron, Ohio, has been announced. Mr. Keener has been a Goodrich vice-president since 1946. Mr. Kelly has been a vice-president of the company since 1953, and also president of the B. F. Goodrich Tire Co., a Goodrich division since 1953. At the same time, Joseph A. Hoban was elected vice-president–marketing of Goodrich, a newly created position, and E. F. Tomlinson was elected president of the B. F. Goodrich Tire Co., succeeding Mr. Kelly. Mr. Hoban and Mr. Tomlinson have served as vice-presidents of the B. F. Goodrich Tire Co. since 1953.

Mr. Keener joined Goodrich in 1937 and became director of business research in 1942. In 1945, he was appointed assistant to the president and became vice-president in 1946. He is a graduate of Birmingham-Southern College and the University of Chicago. He taught business administration at Ohio Wesleyan University prior to joining Goodrich.

Mr. Kelly joined the company in 1925 as a chemist following his graduation from Purdue University. He served in various technical capacities in the United States and Japan, later becoming plant manager of the company's Oaks, Penna., and Clarksville, Tenn., manufacturing plants. During World War II, he directed construction of four man-made rubber plants, and construction and early operation of the Lone Star Ordnance Plant at Texarkana, Texas. Later, he headed manufacturing operations for the B. F. Goodrich Company's Industrial Products Division.

Mr. Hoban, a graduate of Xavier University and the University of Cincinnati Law School, began his career with Goodrich in 1919 as a tire salesman, served in district and zone manager posts and was general manager of tire merchandising before becoming a vice-president of the tire company.

Mr. Tomlinson was graduated from Ohio State University in 1926 and joined Goodrich in 1927 in a sales capacity. He served as manager of farm tire sales, representative of the automotive, aviation and government sales, became general manager of the Industrial and General Products Sales Division in 1949, and, in 1952, was made general manager of the Automotive, Aviation and Government Sales Division of the company.

To Determine Davis Tax Debt

The Internal Revenue Office in Cleveland, Ohio, has announced that it will review the Poncet Davis tax case to determine what the president of the Robbins Tire & Rubber Co., Tuscumbia, Ala., owes the Government in back taxes. When convicted in January, 1954, of tax fraud, it was shown that Mr. Davis hid $868,000 in income in 1945, 1946, 1947 and 1948. Once the total debt, including 6% interest, fraud penalties, and $40,000 in fines, in addition to $738,000 in taxes, is established, a settlement will be discussed with Mr. Davis' attorneys. Mr. Davis is serving a four-year sentence at the U. S. Medical Center in Springfield, Mo. He was sent to the prison hospital because of ill health.

SEVENTH ANNUAL PLASTICS EXPOSITION HELD BY SPI IN NEW YORK CITY

Approximately 30,000 representatives of business, industry, and government attended the seventh annual plastics exposition sponsored by the Society of the Plastics Industry, Inc., on June 11-15 at the Coliseum, New York City. More than 235 individual companies participated in the exposition, occupying some 300 booths. The SPI annual technical conference held at the Hotel Commodore, New York City, concurrently with the exposition, was attended by almost 4,000 persons. All branches of the plastics industry were represented at the exposition including machinery suppliers, molders, fabricators, material suppliers, instrument manufacturers, research and development laboratories, mold makers, etc.

It is interesting to note the major growth shown by the "rubberlike" plastics within the past few years. Many displays concerned themselves primarily with vinyl, polyethylene, polyurethane and polyesters, and machinery and equipment devoted to their production and fabrication were much in evidence. Displays as noted at the Coliseum were uniformly attractive and business was reported as brisk by many exhibitors. The 30,000 visitors in attendance during the week marked a new high for the plastics exposition.

At the exposition, the Archer-Daniels-Midland Co. exhibited its line of plasticizers for polyvinyl chloride resins including epoxy type and copolymer plasticizers. The Bakelite Co. exhibit showed molded and custom applications of special purpose and general purpose compounds. Shown were polyethylene general and special purpose resins and compounds, rigid and elastomeric compounds, etc. Applications of vinyl plastisols and organosols and polyester resins were also displayed at the exposition.

Shows Granulating Machinery

Ball & Jewell, Inc., was represented with its line of plastic granulating machinery used to grind plastic scrap, and the Wheelco Instrument Division of the Barber-Colman Co. exhibited its line of controllers. The Barrett Division of the Allied Chemical and Dye Corp. exhibited various products including polyester resins and elastic polycizers. Bassons Plastic Industries presented a line of plastic molded products.

Polyvinyl chloride compounds and examples of garden hose, sprinklers, medical tubing and electrical sleeving manufactured from these compounds were shown by the Chemical Division of the Borden Co. Plastisol molding compounds were also included in the Borden exhibit. The Chicago Molded Products Corp. showed applications of Campco sheet and film employing rubber-modified styrene, polyethylene and copolymer styrene. Custom molded plastic parts were also shown. Dow Chemical Co. showed its line of Saran polyethylene and polyvinyl chloride molding compounds, while the Polychemicals Department of DuPont showed wire and cable illustrating the uses of Mylar.

The Durez Plastics Division of the Hooker Electrochemical Co. showed a group of plastic molding compounds and applications of Hetron, a fire-resistant polyester resin. The Elastomer Chemical Corp. exhibited a display of foamed vinyl. Polyvinyl chloride resins were also shown by the Escambia Bay Chemical Corp., and the various divisions of the Ferro Corp. showed lines of inorganic pigments, heat and light stabilizers, ultra-violet screeners, thickening agents and other specialty chemicals.

Firestone Plastics Co. showed its Exon resins. Also on display were vinyl foam, PVC valves and piping, tank linings, extrusions, shapes and examples of the uses of plastisol for coatings. Rigid polyvinyl compounds for extruding were shown by the Chemical Division of the General Tire & Rubber Co., and the B. F. Goodrich Chemical Co. exhibited its Geon polyvinyl materials as used in a variety of applications. The Chemical Division of the Goodyear Tire & Rubber Co. showed a group of polyvinyl chloride polymer and copolymer resins and color pellets based on a modified high styrene resin.

Polyester Foam Materials

A complete line of polyester foam materials was shown by the Hudson Foam Plastics Corp. The Hull-Standard Corp. exhibited fully automatic molding presses and a 15 ton automatic transfer press which converts cold powder into a finished product. Injection molding machines with capacity from 6 to 400 oz. were shown by the Hydraulic Press Co. Also shown were compression and transfer molding presses ranging from 100 to 500 tons.

An interesting display was offered by the Instron Engineering Corp. showing its tensile testing instrument, while the Interchemical Corp. showed its line of plastic coatings and various end products fabricated from these coatings. Also seen were R-B-H color concentrates for extrudable thermoplastics, plastisols and vinyl sponge.

Kel-F resins, elastomers, and inks were exhibited by the M. W. Kellogg Co., while Koppers Co. showed its Dylan polyethylene, a new low pressure thermoplastic. Monsanto Chemical Co.'s exhibit showed applications of the company's polyethylene and vinyl. Shown were Ultron sheets and film and accessory products and intermediates. Stabilizers for use in polyvinyl stocks were shown by the National Lead Co. The exhibit by the National Rubber Machinery Co. showed a standard 2½" electrically heated thermoplastic extruder and a composite-type 1" portable sheet plastic extruder. Also shown was a 6" polyethylene blown film dye for heaters and the NRM extruder feedscrew.

The display set up by the Naugatuck Chemical Division of the U. S. Rubber Co. included marvinol polyvinyl chloride resins, Kralastic resin rubber blend molding and extrusion material, and vibrin polyester resins. Many attractive examples were shown. Rigid or flexible cellular plastics, plasticizers, polyvinyl acetate emulsions, etc., were shown by the Nopco Company, and the Ohio-Apex Division of the Food Machinery and Chemical Corp. exhibited a wide line of plasticizers.

Phillips Chemical Co. was represented by its Martex ethylene polymer, and the Plasticizers Division of the Pittsburgh Coke and Chemical Co. showed its plasticizers which are used in vinyl plastics. Applications of polyester resins with special emphasis on their uses in surface coatings and in the formulation of polyurethane foams were shown by Reichhold Chemicals, Inc.

Adhesives for bonding foamed and rigid, plastics to themselves and to metals as well as to non-metals were placed on display by the Rubber and Asbestos Corp. Shell Chemical Corp. showed its Epon resins. F. J. Stokes Machine Co. showed a 2 oz. vertical fully automatic injection molding machine. Also shown was a 15 ton high-speed fully automatic compression press and a 50 ton fully automatic compression molding press as well as a 24" vacuum metallizing unit. Stokes Molded Products showed some typical products molded from unplasticized polyvinyl chloride.

Thickness control equipment using radioactivity was shown by Tracerlab, Inc., and the Royalite Division of the U. S. Rubber Co. showed its Royalite thermoplastic fortified with rubber. John Waldron Corp. showed a line of film and sheet handling equipment, coating machines, embossers, web printing and sheet filming units. The Harchem Div. of Wallace & Tiernen, Inc., exhibited adipate, phthalate, sebecate and permanent type plasticizers for the rubber and plastics industries.

Polyurethane Foam Couplers

Witco Chemical Co. displayed couplers for polyurethane foams; plasticizers to stabilize vinyl resins against heat and light effects; metallic stearates for mold lubrication; extenders for polyvinyl chloride and polyester resins and carbon blacks for coloring plastics.

As previously stated, the SPI Annual Technical Conference was held concurrently with the Exposition at the Hotel Commodore in New York City. Two concurrent sessions were held on the morning of June 11. One of these was devoted to cellulose plastics and the other to sheet forming. Dr. Paul Roach (U. S. Rubber) presided at the first of these sessions, while John W. Knight (Fabri-Form Co.) presided at the second. A general introductory session took place on June 12. Speakers at this session set the tone for the concurrent sessions which took place in the morning on June 13 and 14 at the Commodore Hotel in New York City.

Each keynote address at the session on June 12 was on the general Exposition and Conference theme: "Plastics Shaping Tomorrow's Products." William T. Cruse, executive vice-president of SPI, presided and made the opening remarks. The concurrent sessions held in the morning of June 13 concerned themselves with automotive, packaging and building materials. In the morning of the following day, concurrent sessions were held on refrigeration, air conditioning and communications. The closing session of the SPI Conference took place on June 15 and was devoted to an SPI Molders' Management Division meeting.

TIRE PATENT SUIT OPINION TO BE HANDED DOWN SHORTLY

On June 5, the B. F. Goodrich Co. and the U. S. Rubber Co. temporarily rested their cases in the tubeless tire patent suit which is being heard in Federal District Court, Baltimore, Md. Final arguments for both sides were heard on June 29. In the period between June 5 and June 29, both sides filed briefs. Before the recess, defense attorneys for U. S. Rubber closely questioned W. F. Billingsley, manager of the Goodrich Construction and Design Department, on Goodyear Tire and Rubber Co. documents regarding tubeless tire development. The documents concerned instructions for construction of tubeless tires at Goodyear in the years 1943, 1944 and 1945, before Goodrich received the U. S. patent on which this suit is based. Mr. Billingsley said that all the instructions involved the use of Butyl rubber in the liner of such tires. Defense attorneys declared that only 11 of the 50 instructions involved the use of Butyl rubber.

The defense attorney proceeded to read from what he said were Goodyear code work formulae. Mr. Billingsley was asked if he knew what the work codes meant and Mr. Billingsley replied in the negative. The defense attorney stated that he was informed by Goodyear that in 39 of the cases the work codes did not involve the use of Butyl. The presiding justice upheld an objection that this was hearsay evidence. Earlier, Mr. Billingsley declared that there were important differences between an experimental tire developed by U. S. Rubber and the British patent of 1930 on which U. S. Rubber said it was based. Mr. Billingsley stated that the height of the tread was different, there was a difference in the shoulder construction and in the construction of the heel.

Final Arguments Heard

At the final arguments on June 29, Goodrich attorneys stated that sealing ribs and liners developed by Goodrich under the Herzegh patent and first put on the market in 1948 were not new. Both were old devices, he said. However, a combination of the two was a new, original and vital contribution to the development of tires.

Attorneys for U. S. Rubber argued that the Herzegh patent was vague and indefinite. It was stated that a patent must be drawn so that the public will know what it can and cannot do. The Goodrich patent, it was added, is indefinite. Also disputed was the Goodrich contention that the patent was original. It was stated that there was nothing original about it and that use of sealing ribs and liners in combination had been suggested by dozens of people.

The presiding justice asked if the idea was not original, why had not U. S. Rubber put a tubeless tire on the market in 1948 instead of waiting. U. S. Rubber attorneys replied that with the exception of Goodrich, the rubber industry at that time had only a casual interest in the tubeless tire. This closed final arguments and the presiding justice stated that his opinion would be delivered on July 27.

LABOR NOTES

United Rubber Workers, AFL-CIO, have begun wage negotiations with the Goodyear Tire & Rubber Co., Akron, Ohio, and the Firestone Tire & Rubber Co., Akron. The talks with Goodyear started in Dayton, July 2. The Firestone sessions got under way in Columbus, July 3. Negotiations were also begun with the U. S. Rubber Co., New York, N. Y., in New York, July 2, and June 26 was the starting date for negotiations with the B. F. Goodrich Co., Akron. At the time of this writing, the union had made no specific wage demand on the industry. Union leaders have said only that the goal will be for a "substantial" wage increase. The notices served on the companies provide that if agreement is not reached on new wage scales within 60 days the present contracts can be canceled. Wage settlements were reached in the industry last year without any major strikes.

After a month-old strike at the O'Sullivan Rubber Corp., Winchester, Va., which occurred midnight May 13, the Rubber Workers Union submitted a proposal which the company promised to study. The union's contract plan called for a package increase of 10 cents an hour which would include a 7-cent general wage boost and six paid holidays valued at 3 cents an hour. A union spokesman said there was no counter proposal from O'Sullivan, which obtained an injunction against what was described as "illegal acts" on the part of the union. District union director, Joseph Emmons, described the injunction move "as ridiculous" because there had been "no proven violence" as a result of the walkout. Despite the strike, the plant has remained operating with a reduced force.

The URW has lost another attempt to win bargaining rights for workers at Rempel Manufacturing, Inc., Akron, Ohio. The union was defeated 65 to 61 in a National Labor Relations Board election. Two votes were challenged, but the challenges would not change the result even if ruled for the union. The union needs a majority to win. The NLRB said 143 were eligible to vote in the election to determine whether the employes would have a union.

The 52-day strikes at the Palmerton, Penna., and Depue, Ill., plants of the New Jersey Zinc Co., New York, N. Y., have been terminated. The settlement was on the basis of a general wage increase of 10 cents per hour, combined with improvement in job class differentials, paid holidays and increase of sickness and accident benefits.

Availability of Paracril

Naugatuck Chemical Division, U.S. Rubber Co., Naugatuck, Conn., has reported that after many months of shortages all types of "Paracril" are now in good supply with the operation of the expanded facilities at Baton Rouge, La. In addition, there are now adequate inventories in warehouses in Chicago, Ill., Dundee, N.J., New Haven, Conn., Los Angeles, Calif.

SIX RUBBER FIRMS INDICTED FOR ALLEGED PRICE FIXING

The U. S. Justice Department has announced the indictment of six rubber companies on charges of illegal price fixing in the sale and distribution of industrial rubber drive belts. The indictment, handed down by a Federal Grand Jury in Denver, named as defendants the B. F. Goodrich Co., Akron, Ohio; the Goodyear Tire & Rubber Co., Akron; the U. S. Rubber Co., Philadelphia, Penna.; the Gates Rubber Co., Denver, Colo.; the Dayton Rubber Manufacturing Co., Dayton, Ohio; and the Boston Woven Hose & Rubber Co.

The indictment, under the Sherman Antitrust Act, charges that the rubber companies unlawfully conspired to fix uniform list prices, rates of discounts, terms and other conditions for the sale of the V-belts. The indictment also charged the defendants with agreeing to increase, from time to time, the prices of the belts by lowering the rate of discount from list prices and to fix effective dates for the price changes. The Justice Department said these companies sold about $60,000,000 worth of the rubber belts in 1954.

Companies State Position

In Cleveland, a Dayton Rubber spokesman said the indictment was news to him and that he would not make any comment until he had a chance to see a copy of the indictment and study it.

B. F. Goodrich said: "The B. F. Goodrich Co. has had no opportunity to review the indictment, but reaffirms the position taken by its witnesses before the Denver Grand Jury that it is innocent of the charges made."

A statement by Goodyear said the company has been aware of the Government's investigation of the V-belt industry, but was surprised to learn it has been named a defendant. "Goodyear has consistently maintained its independence of action in the intense competitive conditions encountered in its V-belt business," the statement said. "Moreover, the reasonable levels of prices to consumers over the years, as well as the absence of actual price uniformity, indicates strongly that competition, not price fixing, is the rule in the industry."

Highway Bill Becomes Law

President Eisenhower has signed the Highway Revenue Act of 1956 thus passing into law the new measure which increases the tax on highway vehicle tires from 5 to 8c a pound. The measure is effective as of July 1, 1956. The law also levies a new tax of 3c a pound on tread rubber. The tax on other types of tires remains at 5c a pound and the tax on inner tubes continues at 9c a pound. Attention is also called to the floor stocks tax of 3c a pound which is applicable to tires of the type used on highway vehicles and to tread rubber. Neither the increase in tax on tires nor the floor stocks tax applies to bicycle tires or other tires not of the type used on highway motor vehicles. The manufacturers' tax at 5c a pound, however, continues to apply to bicycle tires as well as other taxable tires not subject to the increased rate.

RUBBER GROUPS ABOUT THE COUNTRY HOLD ANNUAL SUMMER OUTINGS

With the coming of the summer months, many of the rubber groups about the country forego their usual technical meetings to hold picnics, golf tournaments and outings. These affairs normally feature different athletic contests, while those less athletically inclined play cards, nap under a shady tree, or just sit and talk with the boys. Reports on the activities of some of these groups at their annual outings follow:

BOSTON RUBBER GROUP

The 20th Annual Outing of the Boston Rubber Group was held on June 15 at the Andover Country Club, Andover, Mass. The weather was "hot" but it was an enjoyable day for sports and other events. After the activities, about 590 members and guests were served a lobster dinner under the "Big Top". After dinner, the winners of the different sports contests were awarded prizes. Everyone at the meeting received a door prize. Chairman of the outing committee was William King (Acushnet Process). James J. Breen (Barrett and Breen) and Harry Atwater (Malrex Chemical) were also on the committee. Directors of the sporting events were: *Golf Tournaments,* L. Longworth; *Softball Game,* E. F. Freeman; *Putting Contest,* J. Fitzgerald; *Darts,* E. Hurray, A. Panzeri; *Horseshoes,* J. Cullen; *Horse Racing,* C. Meyer; *Tub and Ball Game,* G. E. Herbert.

FORT WAYNE RUBBER GROUP

The Fort Wayne Rubber and Plastics Group held its fifth annual golf outing at the Tippecanoe Lake Country Club, Leesburg, Ind., on June 8. Approximately 245 members and guests attended, a number competed in the golf tourney and others played horseshoe, volley ball, cards or went swimming. A three course dinner of lobster and roast beef was served. Many valuable door prizes were awarded; the grand prize going to A. Costello (Central Rubber). Music was furnished by the Brisco Duo during dinner and afterwards.

The golf prize was awarded to first, low gross, G. Stover, with a score of 78. Mr. Stover received the Goshen Rubber Trophy and another trophy for his score. Under the Peoria system, Lew O'Dell, a guest, won the trophy with a score of 60. Other golf prizes were awarded to R. A. Kurtz (DuPont), for long drive; S. Meyer (U.S. Rubber), for second long drive; closest to pin was W. L. Jones, a guest, and second closest to pin, M. Jones (Marbon). High net was awarded to J. Drompp (General Tire & Rubber). Seventeen other prizes were awarded to runner-up scores.

The prizes were contributed by 114 rubber and suppliers companies. The committee in charge of the outing were: J. Lawless, chairman, (DuPont); K. Tewell (General Tire & Rubber); W. Wilson (R. T. Vanderbilt); T. Saputo (Latex Compounders); R. Rulison (Baker Castor Oil); R. Hartman (Monsanto); A. Robinson (Harwick Standard); J. Porter (Muehlstein); R. Blair (Mogul Rubber), and R. Wettschurack (Brown Rubber).

LOS ANGELES RUBBER GROUP

Approximately 260 members and guests attended the annual Los Angeles Rubber Group Stag Summer Outing which was held June 9 and 10 at the Hotel del Coronado. The 1956 Champions of the various events were: *Tennis,* J. Arensmeyer, B. Hodowski, A. Anderson, A. Federico; *(Low Gross),* D. Montgomery, J. Wilson, R. Bowen; *(Low Net),* J. Keefe, W. Llahmon, A. Marone, M. Butler; *(Blind Boggey),* W. Steinmetz, M. Churchill, L. Hawkins; *Shuffleboard,* W. Gibson, R. Kenealy, P. Ramos, A. Ireland.

Baseball, Suppliers 9 against Manufacturers 7; *Swimming,* D. O'Connell, R. Nagel; *Ping Pong,* R. Reid, F. Price, J. Jones, H. Glimpse; *Pitch & Putt,* H. Brandenburg, S. Slater; *Darts,* J. McSparren, R. Wilson; *Croquet,* T. Abbate, G. Price; *Baseball Toss,* N. Pestal, T. Sloan; *Horseshoes,* J. Adams, R. Dougherty, A. P. Stiller, J. Stetina; *Fishing,* H. Salter, J. Knudson; *Water Polo,* D. O'Connell, J. Ryan, M. Churchill, J. Martinson, E. Lynch; *Bridge,* W. Fairclough, R. Schernner; *Guessing Game,* H. Waffle, H. Robinson.

NEW YORK RUBBER GROUP

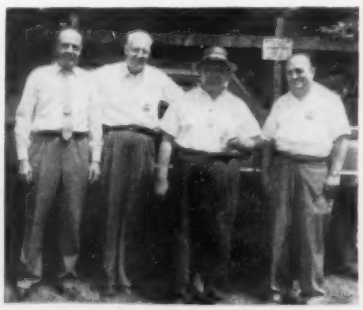
A record attendance of approximately 220 members and guests attended the outing of the New York Rubber Group held at Doerr's Grove in Millburn, N. J., on June 7. The day was marked by exceptionally pleasant weather and practically all of those attending participated in one or more of the planned activities.

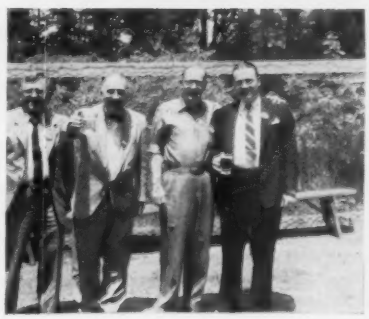
Winners of the various events included the following: *Baseball Throw,* A. Schimpf (Manhattan Rubber); *Basketball Throw,* George Sheppard (General Electric); *Boccie,* L. S. Minckler and W. J. G. McCulloch, both of Esso Engineering, won first place, with second honors to the team of P. Tufts and B. Carney, both of Barrett; *Darts,* M. R. Buffington (Lea Fabrics) and L. S. Minckler (Esso Engineering); *Golf Contest,* O. J. Zeiler (Titanium Pigment) and B. Carney (Barrett); *Horseshoes,* W. F. Lamella (Okonite) and N. L. Hewitt (LaFavorite Rubber). Top honors in the softball contest went to a team headed by Stanley Rutkowski.

Henry Peters (Bell Telephone Labs.) was chairman of the outing. He was ably assisted in various events by the following: *Baseball Throw,* Ralph Ambrose (Rodic Rubber); *Basketball Throw,* Roy Benfer (Dow Corning); *Boccie,* T. T. MacConnell (RUBBER AGE); *Darts,* Dick Glidden (Ames Rubber); *Golf Contest,* Bob Peterson (Ames Rubber); *Horseshoes,* Bill Lamela (Okonite); *Soft Ball,* Al Gessler.

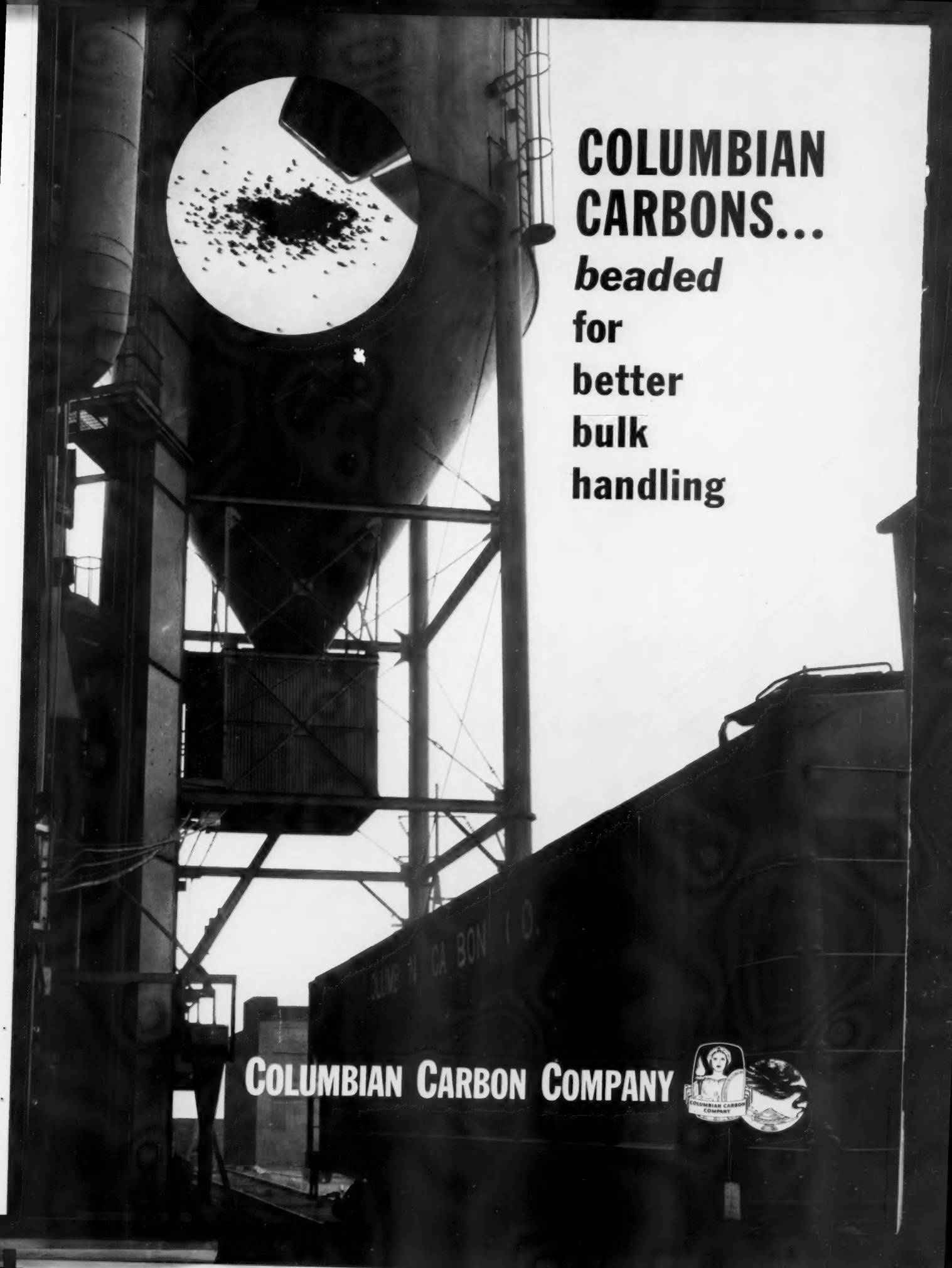
SOUTHERN OHIO GROUP

The Southern Ohio Rubber Group held its tenth annual summer outing on June 2 at the Inland Activities Center, Troy, Ohio. Chairman of the outing was H. Schweller (Inland Mfg.) and his associate was W. Brown (Precision Rubber). Co-chairmen of the golf tourney, which took place at the Miami Shores Golf Club, were J. Kelble (Wright Patterson AFB) and E. Sensel (Standard Oil). Other members who contributed to the success of the outing were: *Food Committee,* D. Strack, H. Weese, L. Jones (Inland); *Beverages,* W. Gordon and T. Hook (Inland); *Indoor Games,* H. Roth (Inland); *Outdoor Games,* A. Ipiotis and J. Szaruga (Inland) and B. Tremblay (Wright-Patterson AFB); *Baseball,* J. Russell, managing Industry and J. Hocking, managing Suppliers.





These scenes of the New York Rubber Group Annual Summer Outing on June 7 are typical of the outings held during the summer months by the different rubber groups. The photographs were taken by New York Rubber Group member Jesse S. Young of the company bearing his name.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NSC RUBBER SECTION PLANS FALL MEETING IN CHICAGO

The Rubber Section of the National Safety Council has announced its program for the 44th National Safety Congress and Exposition which will be held from October 22 through 26 in Chicago, Ill. The Rubber Section will meet on October 22 and 23 at the Conrad Hilton Hotel. The following program has been set for Monday afternoon, October 22:

2:00 P.M.—Opening remarks and reports on sectional activities. *General Chairman,* W. M. Graff (U. S. Rubber).

2:15 P.M.—Report of the Nominating Committee will be given by R. A. Bullock (Corduroy Rubber).

2:25 P.M.—Election of officers for the 1956-57 season.

2:30 P.M.—Report of the Statistics Committee by N. C. Longee (U. S. Rubber).

2:45 P.M.—Rubber Industry Safety Round Table Discussion. (1) Training Supervision. *Conference Leader,* W. J. Dooling (Hood Rubber); *Conference Recorder,* H. L. Andrews (Firestone). (2) Power Tractors — Gas and Electric — Propane. *Conference Leader,* R. S. Farnum (U. S. Rubber); *Conference Recorder,* A. B. Maines (Republic Rubber). (3) Fire Safety in Rubber. *Conference Leader,* George Burkhardt (General Tire); *Conference Recorder,* Nick Hunter (Dunlop). (4) Safety in Reclaim Plant Operations. *Conference Leader,* R. M. Boyles (Midwest Rubber Reclaiming).

(5) Personnel Protective Equipment (Eye and Foot Protection). *Conference Leader,* Ed Turner (Goodyear); *Conference Recorder,* C. S. Kruger (Carlisle Tire). (6) Safety in Mechanical Goods Manufacturing. *Conference Leader,* J. C. Milarch (Corduroy Rubber); *Conference Recorder,* C. R. Covert (Goodyear). (7) Health Hazard of New Chemicals. *Conference Leader,* R. H. Wilson (Goodrich); *Conference Recorder,* F. W. Sands (U. S. Rubber). (8) Safety in Synthetic Rubber and Raw Material Operations. *Conference Leader,* G. T. Shuster (Texas-U. S. Chemical); *Conference Recorder,* J. C. Utley (Firestone).

On Tuesday afternoon, October 23, there will be a luncheon. Jack Kidney (Goodyear) will serve as master of ceremonies. At 2:15 P.M. there will begin a resume of the round table discussion held the previous day. This phase of the program will be presided over by J. L. Dean (Firestone).

Visits American Rubber Officials

P. B. L. Coghlan, a director of the Natural Rubber Development Board, London, England, recently completed a two-week business trip to this country. While here, he visited the Natural Rubber Bureau in Washington, D. C., and rubber officials in Akron, Ohio, Buffalo, N. Y., and New York City. Mr. Coghlan is chairman-director of Eastern Industries which operates a number of large properties in Malaya and Indonesia, and he is a past chairman of the Natural Rubber Development Board and the Rubber Growers Association.

Coming Events in the Rubber Industry

July 27. Chicago Rubber Group, Annual Golf Outing, Medinah Country Club, Medinah, Ill.

Aug. 2. New York Rubber Group, Golf Tournament, Innis Arden Golf Club, Old Greenwich, Conn.

Aug. 17. Philadelphia Rubber Group, Manufacturers' Golf & Country Club, Oreland, Penna.

Sept. 8. Connecticut Rubber Group, Summer Outing.

Sept. 13. No. California Rubber Group, Golf Outing, Castlewood Country Club, Pleasanton, Calif.

Sept. 18-21. Division of Rubber Chemistry, A.C.S., Chalfonte-Haddon Hall, Atlantic City, N. J.

Sept. 27. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Sept. 28. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Oct. 2. Buffalo Rubber Group, Fall Meeting.

Oct. 2. Los Angeles Rubber Group, Statler Hotel, Los Angeles, Calif.

Oct. 5. Boston Rubber Group, Fall Meeting, Hotel Somerset, Boston, Mass.

Oct. 5. Detroit Rubber & Plastics Group, Fall Meeting, Detroit-Leland Hotel, Detroit, Mich.

Oct. 5. New York Rubber Group, Henry Hudson Hotel, New York.

Oct. 10. No. California Rubber Group.

Oct. 11-12. Society of the Plastics Industry, New England Section Conference, Wentworth Hotel, Portsmouth, N. H.

Oct. 25. So. Ohio Rubber Group.

Oct. 26. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Oct. 26. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Nov. 2. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Nov. 8. No. California Rubber Group.

Nov. 8. Rhode Island Rubber Club, Fall Meeting, Pawtucket Country Club, Pawtucket, R. I.

Nov. 14. No. California Rubber Group.

Nov. 16. Connecticut Rubber Group.

Dec. 4-5. Society of the Plastics Industry, Seventh Film, Sheeting and Coated Fabrics Division Conference, Commodore Hotel, New York City.

Dec. 5. Buffalo Rubber Group, Xmas Party.

Dec. 6. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Dec. 7. Detroit Rubber & Plastics Group, Xmas Party, Sheraton-Cadillac Hotel, Detroit, Mich.

Dec. 7. No. California Rubber Group, Xmas Party, Orinda Country Club.

Dec. 14. Boston Rubber Group, Xmas Party, Hotel Somerset, Boston, Mass.

Dec. 14. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 15. So. Ohio Rubber Group.

Dec. 21. Chicago Rubber Group, Xmas Party, Morrison Hotel, Chicago, Ill.

Jan. 25, 1957. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Jan. 25, 1957. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Feb. 15, 1957. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Mar. 15, 1957. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Apr. 26, 1957. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

May 15-17, 1957. Division of Rubber Chemistry, A.C.S., Joint Meeting with Rubber Chemistry Division of C.I.C., Sheraton-Mount Royal Hotel, Montreal, Que., Canada.

ASTM COMMITTEE D-11 HOLDS ANNUAL MEETING IN ATLANTIC CITY

Committee D-11 on Rubber and Rubber-like Materials of the American Society for Testing Materials held its annual meeting on June 20, 21 and 22 in Atlantic City, N. J., in conjunction with the 59th Annual Meeting of the parent society. Subcommittee meetings were held both in the morning and afternoon on June 20 and 21, while the session on June 22 was devoted to an annual meeting of Committee D-11 and election of officers and the presentation of two technical papers. Simon Collier (Johns-Manville) was re-elected chairman of Committee D-11 and Harry Bimmerman (DuPont) was elected vice-chairman. John Allen (Firestone) was elected secretary succeeding the retiring Arthur W. Carpenter.

It was announced at this meeting that R. A. Shatzel (Rome Cable) had been elected president of ASTM. It was also announced that Mr. Collier, in recognition of sustained support of ASTM technical and administrative work, particularly in Committee D-11, has been presented the ASTM Award of Merit.

Tribute Paid to Carpenter

Incidentally, at the dinner meeting of the Advisory Committee and subcommittee chairmen of Committee D-11, special tribute was paid to Mr. Carpenter who retired as secretary of the Committee after many years of service. Mr. Carpenter is a past-president of ASTM. Special comments befitting the occasion were made by Mr. Collier and by R. J. Painter, executive secretary of the parent society. A gift in recognition of his many years of service was presented to Mr. Carpenter.

Another feature of the ASTM Annual Meeting was the Edgar Marburg Lecture which was presented this year by C. E. Reed, general manager of the Silicone Products Department of the General Electric Co. Mr. Reed chose as the topic for his lecture "The Industrial Chemistry, Properties, and Applications of Silicones."

Dr. Reed discussed the basic chemical structure of silicones with particular reference to their similarities and differences compared with other industrially important polymeric substances, and the physical and chemical properties of silicones leading to their industrially important applications. He took up processes of manufacture, the important types of silicones and their applications, ending with a look into the future of silicones in selected industries such as electrical, aircraft, protective coating, and textile.

Simon Collier

reelected chairman of ASTM Committee D-11

In other happenings at the meeting, it was announced that F. C. Thorn (Garlock Packing) had been elected an honorary member of D-11 on the occasion of his retirement. He is succeeded as chairman of Subcommittee 6 by R. F. Anderson (Goodrich). F. H. Fritz (DuPont) has succeeded W. N. Keen (DuPont) as chairman of Subcommittee 19. Mr. Keen recently received a new assignment with Du Pont which makes it impossible for him to continue in his position as chairman of Subcommittee 19.

It was also decided at the meeting that the Finance Committee of D-11 undertake to establish a program to continue the solvent operations of D-11. Some thought was also given to the consideration of ways and means to contribute to D-11's participation in the probable meeting of ISO/TC-45 in this country in 1959.

The 59th Annual Meeting of ASTM featured an apparatus exhibit in which 40 leading manufacturers and distributors from the United States and Canada, including representatives of European companies, took part in the 12th Exhibit of Testing and Scientific Apparatus and Laboratory Supplies. On display were hundreds of items ranging from small hand manipulated instruments through electronically controlled devices and high temperature ovens to universal testing machines.

Interesting Exhibits Shown

Among the exhibits was a display by Atlas Electric Devices Company showing its latest model Weather-Ometer for accelerated weathering tests on rubber. The Instrument Department of General Electric showed a large variety of specialized instruments, and Leeds and Northrup Co. was represented with a new type K-3 Universal Potentiometer. Scott Testers, Inc., displayed a new Mooney viscometer. Also displayed was the LGP aluminum block oven for special aging tests and elastomers.

A new table model Instron for tensile and compression setting with full scale load rangings from 10 to 200 pounds was shown by the Instron Engineering Corp. Tinius Olsen Testing Machine Co. showed a 12,000 pound universal testing machine and a variety of electronic instruments, including dual recorders for recording stress versus time.

An attractive exhibit by the National Bureau of Standards depicted the quality control of many industrial products, and Baldwin-Lima-Hamilton Corp. showed a new lever type pre-testing machine. There were many other attractive displays including those by the Thwing-Albert Instrument Co., Bendix Aviation Corp., Fisher Scientific Co., Custom Scientific Instruments, Inc., Central Scientific Company, etc.

Arthur W. Carpenter

honored by D-11 on occasion of his retirement as secretary.

At the Annual Meeting of Committee D-11 which took place on the morning of June 22, two technical papers were presented. Max Hanok (New York Naval Shipyard) presented his paper on "Measurement of Elastomer Hardness at Low Temperatures" and E. M. Baber (Goodrich) presented his paper on "Testing Design for Precision."

There follows herewith reports from the chairmen of the various subcommittees which met during the Committee D-11 meeting.

Subcommittee 1—Hose (R. A. Bonnell, Goodyear, Chairman): This subcommittee met to discuss again a proposed tentative specification covering methods of testing rubber hose. Recently, a proposed specification covering methods of testing rubber hose was received from the Bureau of Standards. This was examined and certain portions used to further amend the February, 1956, ASTM proposed tentative specification.

As of this date, the suggested main changes of and additions to the present D-380-54T consist of the following: (1) The addition of instructions covering wire braided hose with regard to length change under pressure; (2) The addition of the test tube method of heat aging rubber as covered by Designation D-865; (3) The addition of details covering methods of making test covering length change, twist, warp, rise and expansion of hose; (4) The addition of volumetric expansion test procedure, and (5) The addition of procedures covering low temperature tests on complete hose and on tube and cover.

It was agreed that a new draft of the proposed specification be drawn up to include the amendments of March 2 and June 21, and the subcommittee again be letter balloted. The subcommittee was also asked to consider a change in an editorial note appearing in the recently proposed changes of D-

296 which covers fire hose. This change involves rewording of the note pertaining to jacket materials and was requested by Boston Woven Hose and U. S. Rubber. Agreement by the committee to make the requested change was unanimous.

Subcommittee 5—Wire and Cable (J. T. Blake, Simplex Wire & Cable, Chairman): The following subjects were discussed: (1) The results of the recent letter ballot; (2) Liaison activities with subcommittee 16; (3) Liaison activities with D-20, and (4) Addition of revised and enlarged braid specifications to D-1350.

There was considerable discussion of statistical testing methods and its bearing on future changes in subcommittee 5 specifications. It was voted to solicit a paper for the Spring Meeting and to suggest one for the D-11 meeting at that time. It was voted to consider the introduction of corona test methods in D-470 and requirements in D-1350. It was voted unanimously that the subcommittee extend to R. A. Schatzel its heartiest congratulations and best wishes on his election as president of ASTM and on his honorary degree from Union College.

Subcommittee 6—Packings (F. C. Thorn, Garlock Packing, Chairman): The meeting was devoted entirely to consideration of a revision of D-733 (Methods of Test for Compressed Asbestos Sheet) as proposed by a section headed by Mr. Dober. The purpose of the revision is to render the methods more readily usable by Tech. A members, who cross-reference to it in D-1170, and also eliminate some internal inconsistencies. The complete revision has been offered to D-11 for adoption subject to retroactive letter ballot.

Subcommittee 7—Rubber Latices (G. H. Barnes, Chairman): A method proposed by BSI for testing uncured dried films of latex for color evaluation was reviewed. Little interest was shown and no further action is to be taken. A task group which reviewed methods for determination of volatile fatty acids recommended a modified RRI of Malaya method. It was agreed by the subcommittee that this method would be written up and submitted to Committee D-11 for letter ballot as a method only. A review of work done on evaluation of three methods of determination of density showed good agreement when applied to centrifuged latex. As BSI reported difficulty with these methods when applied to a cream latex, a task group was appointed to study density of creamed latex.

The present specification, D-1076-54T, covers only ammonia preserved centrifuged and creamed latices. The subcommittee voted to add two further classifications of latex, namely Type III centrifuged natural latex preserved with low ammonia with other necessary preservatives and Type IV creamed natural latex preserved with low ammonia with other necessary preservatives. These new types of latex conform to the present specification requirements except that total alkalinity calculated as ammonia shall not exceed 1.0% based on the water phase as contrasted to the present minimum requirements of 1.6%. The addition of these two types of latex should be submitted to letter ballot of Committee D-11.

Since some confusion has resulted from the present directions for determination of KOH number, it was agreed to clarify the wording and example used. This should be submitted to Committee D-11 by letter ballot.

Subcommittee 9—Insulating Tapes (C. W. Pickells, Consolidated Edison, Chairman): The subcommittee heard a report of the task group which has been preparing revisions of the procedures for sampling, accepting and rejecting friction, rubber insulating, and ozone-resistant rubber tape. The members present approved a proposal to select sample rolls from whole shipments (a shipment not to exceed 5,000 rolls) instead of dividing the shipments into lots and sampling each lot. Acceptance or rejection would then be by "shipment" instead of by "lot." They did not approve a proposal to divide measurements and tests into two categories; one of "major" importance to require retest for all requirements in the event the samples fail to meet one or more; the other of "minor" importance to require retest only for the requirements that were not met on the first test. The present procedure which requires retesting only the characteristics where failure occurred is considered satisfactory.

All revisions that have received approval will be submitted to the subcommittee for letter ballot. The subcommittee will consider a proposal to add a requirement for moisture absorption in the specifications for rubber tapes.

Subcommittee 10—Physical testing of Rubber Products (L. V. Cooper, Firestone Chairman): The letter ballot in subcommittee 10 in regard to the strain testing of rubber was reported as favorable and was recommended to D-11 for letter ballot. The report of the D-11 ballot on O-ring testing was discussed and it was agreed that the matter of proper jaws and their possible mechanical rotation should be investigated further. R. F. Turner will act as chairman of this section. The report on the calibration of tensile test machines survey was not conclusive and this section also will continue their investigation. David Scott (Scott Testers) will head this task group.

Subcommittee 11—Chemical Analyses (W. P. Tyler, B. F. Goodrich, Chairman): Nothing was undertaken requiring D-11 action. Brief discussion was held concerning three possible methods for analysis of sulfur in rubber compounds. It may be necessary to appoint a new task group for this work. A study of the pyrolysis method of analysis for carbon black in rubber has been initiated by Mr. Simms, task group chairman. Work will be initiated on studying extraction methods for synthetic rubbers, and for examining recent new methods for lead and zinc determination. New synthetic rubber methods submitted by subcommittee 13 will be reviewed.

Subcommittee 12—Crude Natural Rubber (Norman Bekkedahl, National Bureau of Standards Chairman): A progress report was presented by L. G. Mason, chairman of a task group on Test Methods and Specifications for Crude Natural Rubber. It was the consensus of the task group that test procedures should be made available by ASTM for all of the proposed natural rubber specifications. ASTM procedures are already available for dirt content, ash, copper, manganese, and rubber hydrocarbon content. ASTM procedures will soon be available for volatile matter, cure index, and stress-strain tests. The task group recommends that the natural rubber specifications apply only to No. 1 and No. 1XRSS and to No. 1 and No. 1X pale crepes. It also recommends that it be given authority to accumulate the necessary data to establish the proper tentative specification limits for the rubbers. After considerable discussion the report of the task group was accepted by the committee with the suggestion that it concentrate its initial studies on smoked sheets.

Subcommittee 13—Synthetic Elastomers (B. S. Garvey, Jr., Sharples Chemical, Chairman): Mr. Mason reporting for his group stated that the letter ballot on size of random sample was favorable for everything except in the case of the one to be used for Mooney test. D-927-53T calls for 200

Scientist Shortage Predicted

The nation faces a shortage of 457,000 scientists and engineers by 1965, according to a study made by the Manufacturing Chemists' Association. The chemical industry alone will have a "probable shortage" of 93,000 scientists and engineers within 10 years. The MCA study reports that at the present time there are 884,000 scientists and engineers employed in the United States. Of this number, 713,000 are in industry, with 77,000, or 8.7 of the national total, employed in the chemical and allied products industries. By 1965, it is anticipated that the supply of scientists and engineers will increase to 1,223,000 but that 1,680,000 will be needed, leaving an over-all shortage of 457,000. The study shows the chemical industry will probably be able to employ no more than 106,000 but will need 199,000 and will face a shortage of 93,000 scientists and engineers unless the supply is substantially increased.

gms. and the old FFC specifications called for 250 gms. It has been agreed that D-927 will be changed to 250 gms. Two sampling plans were suggested and all committee members have been asked to evaluate the methods and send their results to Mr. Mason.

Mr. Pryor stated that procedures have been prepared and are now being evaluated for ETA, oil content, alkyl phenol and antioxidants in oil extended rubbers.

Mr. Cooper reported that subcommittee 29 had taken over D-15 revision and after considerable discussion the group decided to have Task Group No. 3 cooperate with the task group in 29 in the rewriting of D-15.

Mr. Patterson stated that his group's work was almost completed with the publishing of the tentative method for testing synthetic rubber latices. Some changes may be necessary but they will be editorial in nature.

R. G. Seaman reported on the results of the letter ballot sent out on May 1, 1956, stating that 5 or 6 negative votes were received on each of the various sections. He stated most negative votes were vague and possibly were due to lack of understanding. By vote, the subcommittee voted to recommend to D-11 to replace the Nomenclature Standard Practice Specification on page 38 in the yearly report of D-11 by the letter balloted system sent out May 1 deleting the S designation in section 2 and DSBR in section 3 subject to retroactive letter ballot.

Mr. Otto stated that the standard bale had been obtained and the plans were underway for the cross check in possibly 13 laboratories. The committee on code numbers reported that the producer should have the right to decide when an experimental polymer was entitled to consideration as a standard polymer. The mechanics of assigning standard numbers has not as yet been set up. The subcommittee voted that the producer would have to present the data to justify the regular number assignments. The committee also voted to recommend to letter ballot that the assignment of experimental numbers be further broken down as follows: 0-49, Hot polymer; 50-99, Hot black masterbatch; 100-149, Cold polymer; 150-199, Cold black masterbatch; 200-249, Cold oil extended; 250-299, Cold oil black masterbatch; 300-349, Hot latex; 350-399, Cold latex; 400-499, unassigned.

The subcommittee voted to ask D-11 for permission to appoint an ad-hoc committee with authority to handle the assignment of polymer designations. The subcommittee also voted that all producers be notified by means of a letter signed by both the chairman of subcommittee 13 and the chairman of D-11 as to recent actions concerning numbering systems.

Subcommittee 15—Life Tests for Rubber Products (G. C. Maassen, R. T. Vanderbilt, Chairman): The report of section 2 pertaining to correlation of oven aging with extended natural aging indicates that after 8 years of natural aging the tensile properties as measured by modulus change are leveling off. It is estimated that within another 4 years the samples stored in the United States will have reached a level of change equal to those which have been stored in Liberia for 8 years. It was moved, seconded, and passed that this problem be concluded after 12 years exposure, 4 years hence.

Mr. Norton reported that to date a better method for evaluating the light source in the Weatherometer and Fadeometer than that now presently prescribed has not been evolved. He recommends waiting for work now being done in D-20 to be completed. He was also assigned the job of rewriting D-750-55T to conform with E-42-55T

On ozone testing, Mr. Carlson reported that 15 Mast Ozone Testers have now been completed and a round-robin to evaluate those machines is planned prior to the next meeting of subcommittee 15.

Mr. Maassen reported that tests indicated no effect on degradation of tensile properties due to varying rate of air change between zero and 250 changes per hour. This information was given to Dr. Stiehler for transmittal to ISO/TC-45 with whose results this data concurs. Work on revising D-581 is still in progress.

V-Belt Knife Sharpener

A newly patented resharpening device attached to the rotary blades used for cutting V-belts is now in use at the Dayton Rubber Co., Dayton, Ohio. More efficient production and more uniform products have resulted, according to company officials. Before the knife sharpener was put to use, costly down time of V-belt cutting machines was required as rotary blades were frequently removed for resharpening. A fluid-pressure motor oscillates two abrasive elements against both sides of the blade's cutting edges.

Subcommittee 16 — Description and Classification of Rubber Compounds (J. F. Kerscher, Goodyear, Chairman): Mr. Fred Thorn's letter to the chairman which was circulated to the entire subcommittee with a request for comments was first discussed. Mr. Thorn made these points: The function of this subcommittee is merely to set up a system of description and classification applicable to all rubber compounds. It has nothing to do with specifications. Wire and Cable Subcommittee will continue to write specifications applicable to the component parts of their individual products, taking the appropriate line from the tables as a basis. Hose Subcommittee will, if it desires, write specifications for various types of hose, picking their hose cover and tube stocks from the master tables.

These points were followed by the following questions: What is your objection, if any, to the D-735 system considered solely as a basis of description and classifications? What do you propose to substitute for it?

These points resulted in the following actions by the subcommittee: (1) Change of title of subcommittee 16 to "Description and Classification of Rubber Compounds"; (2) Change in scope to "To prepare a system for description and classification of rubber compounds for general use"; (3) Delete from its original scope reference to cooperation with ISO/TC-45 since this is presumed to be automatic; (4) A motion was passed to form a task group whose duty it will be to iron out present differences and recommend a generally acceptable system for the description and classification of rubber compounds for general use. The chairman of subcommittee 16 will designate this task group in the near future.

A questionnaire to determine the American attitude towards the proposal of Working Group No. 6 of ISO/TC-45 represented by Document 252 was circulated in subcommittee 16.

Fourteen replies were received and it was apparent that there were some items in the WG No. 6 proposal on which there was general agreement, but there were also several items on which there was considerable disagreement. The chairman of subcommittee 16 appealed for additional replies by July 21. After that date the replies will be forwarded to WG No. 6 ISO/TC-45 for their examination and consideration.

Subcommittee 17—Tests of Hardness, Set and Creep (S. R. Doner, Raybestos-Manhattan, Chairman): The chairman reminded those present that the ISO Recommendation No. 50 for determining the hardness of rubber will be published in the 1956 ASTM Handbook, and asked that everyone cooperate in evaluating and studying this new method so that by the next meeting there may be some comments based on experience with it.

Mr. Frye reported that the round-robin test program comparing the various hardness test instruments had been completed and the data is now in the hands of the Statistical Quality Control Committee for evaluation. It is hoped that a finished report can be presented at the next meeting.

Mr. Shore of the Shore Instrument Co., announced that a maximum reading Durometer is now available. Mr. Bachelder of Testing Machines Inc., announced that they are handling the distribution of a Micro-hardness testing instrument manufactured in England. The first instrument had just been received and little is known about it at this time.

Subcommittee 18—Flexing Tests (H. Tangenberg, Chairman): With reference to the status of the following standards, subcommittee 18 desires to: (1) Maintain D-430-51T as tentative because of

impending changes; (2) Advance D-623-52T to a standard; (3) Retain D-813-52T as tentative because of impending changes; and, (4) Retain D-1052-55 as standard. The changes listed by R. Stiehler on D-430 and D-813 were approved by the task committee thus bringing them in conformance with ISO Documents 258 and 257, respectively. The committee approved these changes for letter ballot. There was no new business.

Subcommittee 19—Immersion Tests (W. N. Keen, DuPont, Chairman): The chairman read the minutes of the last meeting and discussed the activities of Task Group A. Task Group A, while still active, continues to have difficulty in coming to a firm decision on the reproducibility of tests conducted at temperatures of 250°F. and above, as described in D-471-54T.

F. C. Thorn, chairman of another group, recommended that subcommittee 19 give consideration to a new tentative method of test for change in length of an elastomeric vulcanizate resulting from immersion in a liquid. This tentative method of test is made up of Method B of D-471-54T and the method developed by F. C. Thorn. Subcommittee 19 voted to submit the proposed tentative method and the accompanying revisions to letter ballot within the committee.

The chairman reported the outstanding differences between ISO/TC-45's Draft 238 "For Testing the Swelling of Vulcanized Rubber," and ASTM D-471-54T. The chairman will learn if ISO/TC-45 is expecting a report on this draft from ASTM D-11.

Subcommittee 21—Cements and Related Products (J. F. Anderson, B. F. Goodrich, Chairman): It was decided by previous letter ballot to add the Brookfield Viscometer to D-553-42 as a method of test for viscosity of rubber cement adhesives and related products. J. P. Sanders will submit a method of test to be circulated to the committee for approval. It was announced that D-816-51T will be advanced to standard.

Mr. Steinberg requested clarification of the meaning of the peel test described in D-14 method D-903-46T. He will submit a formal request to the chairman who will request necessary information and interpretation from D-14.

Regarding the work on D-1205-53T, bonding of brake linings, C. R. Lupton reported on the work of SAE subcommittee 8, suggesting that there is a need for cooperation between that committee and subcommittee 21 of D-11. The chairman has requested information regarding possible formation of a section of technical committee "A" to coordinate the work of the two groups.

An impact test submitted by one member is to be given more attention at G. M. research before general circulation is considered. This also applies to bonds between friction materials and metals. Another new test under consideration for addition to D-1205 is the bend test, based on a method submitted by R. G. Westerman. This method has been written in form for circulation to the subcommittee for approval.

Subcommittee 22—Cellular Rubbers (H. G. Bimmerman, DuPont, Chairman): Mr. Carpenter reported that there had been no dissenting votes on the changes in D-1055 and D-1056 which were in the D-11 letter ballot. Dr. Yoran stated that he would give these changes to section 4 of Tech. A so they could be incorporated in the SAE handbook.

Dr. Yoran reported that Tech. A had covered several comments on the SPI draft of vinyl foam specifications and that these would be sent to SPI. The chairman will also send subcommittee 22's comments and state that the subcommittee is in agreement with Tech. A's suggestions. As soon as SPI rewrites the specification, subcommittee 22 will expedite getting these into the ASTM manual.

Mr. Barnes submitted copies of the SPI preliminary, tentative specifications for urethane foams. He emphasized the preliminary nature of these specifications. At the present time the temperature-humidity aging method has not given uniform results and cannot be considered satisfactory for specification use. More work is underway to attempt to determine the causes of the variation. Mr. Barnes would appreciate any suggestions on this or any other test. Mr. Miserentino questioned whether the drying period after exposure was long enough. These specifications will be sent to members of subcommittee 22 who were absent with a request for their prompt comments. Mr. Miserentino would like to make some comparisons of testing methods on the IP and Instron tests. Mr. Frye and the chairman agreed to participate.

Mr. Sereque stated that there was some consideration underway concerning changes of flat stock ranges.

Mr. Werkenthin had sent a copy of the Bureau of Ships report on June 22, 1956, of the Pandux tester. Additional copies will be sent by Mr. Chatten and these will be sent to members of the subcommittee who request them.

Subcommittee 23—Hard Rubber (W. J. Dermody, Stokes Molded Products, Chairman): R. Wentland reported on the status of work on an impact test for hard rubber. The work currently going forward in D-20, subcommittee 17 A and H and in D-20 subcommittee 19 was discussed. The interest of D-11 in

DAYTON RUBBER INSTALLS GIANT POLYURETHANE UNIT AT MARIETTA PLANT

A giant machine capable of producing 8,000,000 pounds of polyurethane a year has begun operation at the Marietta, Ohio, plant of the Dayton Rubber Co. The mammoth unit, shown above, said to be the first of its kind in America, spews out 22 pounds of pure foamed polyurethane slabs every minute, one of the fastest production cycles in industry. The synthetic foam, to be marketed under the name of "Poly-Koolfoam," is produced as a "bun" that can be cut to any length and fabricated into many different products. Dayton Rubber will supply slab stock to many industries for fabrication.

More than 2,000,000 pounds are being produced annually by American Latex Products Corp., Hawthorne, Calif., a subsidiary plant of Dayton Rubber. The output of the Marietta plant will give Dayton Rubber a combined annual 10,000,000 pound production capacity—equivalent to between 20 and 30,000,000 pounds of latex foam rubber because of Poly-Koolfoam's lighter weight. The remarkable production cycle of Poly-Koolfoam is possible because the chemical reaction takes place in just a few seconds. A special liquid polyester resin, a liquid diisocyanate and a catalyst are brought together at a predetermined rate at one end of the huge machine. The chemical product expands and forms the full sized "bun" in a matter of seconds.

Dayton Rubber's entry in the polyurethane field augments the company's already broad diversification program. The company has pioneered many developments for the automotive, industrial, textile, railway, agricultural, printing roller, furniture and bed pillow fields.

an impact test is centered in subcommittee 23 because this subcommittee is concerned with materials of a rigid rather than elastomeric character. Accordingly, any work done in D-11 on impact testing will originate in subcommittee 23.

A proposal for revision of the falling, weight impact test in D-530-55T was introduced on a motion by J. R. Smyth and will be submitted to letter ballot of the subcommittee. The proposed revision is suitable for proof or product testing only and is not intended to provide a source of design or strength-of-materials data. The task force will continue work toward obtaining a method suitable for both purposes.

K. C. Bushway, who is replacing P. Harriman on the subcommittee, will continue work on Durometer D hardness and will prepare a draft of a method for inclusion in D-530 for discussion at the next meeting.

Mr. Wentland will draft an editorial change in the hot-cold cycle test in D-639 and this will be circulated for approval of the subcommittee at the same time as the letter ballot on revision of D-530. Mr. Smyth has been appointed head of a task force to bring together available data on the acid-solubility test round-robin.

The question of encouraging greater consumer interest participation in this subcommittee was discussed at considerable length. It was decided that, since the bulk of hard rubber products are consumed by the automotive battery and water meter producers, twelve of the largest producers in these fields will be invited to appoint representatives to participate in the work of the subcommittee.

H. Peters expressed a desire on the part of consumers for a definite material specification classifying available materials in terms of recognized and readily distinguishable grades.

A draft of British Standard CW (RUC) 1213 for the determination of plastic yield of ebonite has been received for comment through the Society from the British Standards Association. Copies will be circulated to the members to obtain their opinions.

The definitions of hard rubber as set forth in D-530 and in the forthcoming ASTM Glossary of Terms were discussed. The subcommittee decided that any immediate action would serve to further confuse rather than to clarify the situation and that this subject might better be reserved for future consideration.

Subcommittee 24—Tests for Coated Fabrics (K. L. Keene, U. S. Rubber, Chairman): Request of Northrop Aircraft, Inc., for investigation of adhesion properties of coated fabrics by the use of the Stoll Flex Abrasion machine was not approved because data indicated this machine is not suitable for determining adhesion. The following changes in D-751-52T were recommended by Mr. McMannus and approved for letter ballot in D-11. In paragraph 6 under "Weight": Insert after "weighed on a calibrated scale" "to an accuracy of 0.25%". This applies to both "a" and "b" methods. Also add to both "a" and "b" methods "The weight shall be reported in ounces per linear yard or ounces per square yard to the nearest 0.1 ounce." In paragraph 28 delete wording "Modified diaphragm bursting tester Mullen Test" and insert "Mullen Type Hydrostatic Tester." In paragraph 29 reword "a" to describe in detail the requirements for the machine and delete "b" and "c". In paragraph 31 make minor changes in the reading so as to clarify procedure. Procedure B same as 31.

Task group on low temperature resistance, headed by J. E. Hororka of Ford Motor Co., reported progress on work and was requested to continue study to include additional methods and materials. No report was received from the task group investigating stitch tear device. Task group on Adhesion Tests headed by E. B. Roberts, Hood Rubber Co., reported further progress and expects to have a report on round-robin tests at next meeting.

The following task groups were appointed: Oven Aging Methods, chairman, W. H. Bryan (DuPont); Fade-Ometer and Weather-Ometer Aging, chairman, R. W. Stephens (Goodrich).

Subcommittee 25—Low Temperature Tests (R. S. Havenhill, St. Joseph Lead, Chairman): Irving Kahn and R. E. Ofner discussed the various factors involved in trying to make the proposed ISO low temperature hardness test (MLI instrument) conform with the ISO room temperature test (Wallace). Copies of report 56-1759 were distributed, comparing the MLI and Admiralty instruments on 11 stocks at room temperature and —40°F. Both instruments showed equal precision.

W. A. Frye passed out copies of his report showing that the present ISO instrument (Wallace) became entirely inoperative at temperatures of —65°F. His report included data on 7 stocks at temperatures down to —65°F. with Shore A, Wallace hand meter as well as the Wallace dead load meter.

It was agreed that the Wallace ISO room temperature tester could not be used for low temperature work and that the standard ISO room temperature hardness method should be revised by deleting the section which requires an attached or built-in foot. This would allow use of the Admiralty instrument with a separate foot, for both room and low temperature. Dr. R. D. Stiehler will contact Dr. J. R. Scott of ISO on this.

It was also agreed that repeat test using double the major and minor loads will be run by Mr. Ofner and the temperature will be extended to —65°F. Tests will also be run in liquid media. Mr. Kahn and Mr. Ofner reported on their recent work on the effect of speed on brittleness temperature. W. J. Simpson and R. G. Dunlop outlined work in this connection and will forward additional details to the chairman.

Subcommittee 28—Statistical Quality Control (E. M. Bader, Goodrich, Chairman): The work of this subcommittee of reviewing data in conjunction with the other subcommittee is continuing. The main project of this subcommittee, the "Recommended Tentative Practice for Inter-Laboratory Experiments" has been completed and submitted to letter ballot of Committee D-11. During the meeting, the problems related to describing sample sizes and their interpretation in Committee D-11 methods, procedures, and specifications were reviewed. A section with J. I. Black as chairman was appointed to review these problems and the related conditions of D-11 specifications. Also a section with E. F. Wood as chairman was appointed to perform a similar task on D-11 methods and procedures. A report of the findings of these two sections is expected to be presented at the Spring meeting of D-11.

Subcommittee 29—Compounding Ingredients (A. E. Juve, B. F. Goodrich, Chairman): A task group which has been assigned the problem of determining the possible advantage of using reference carbon blacks for comparisons of samples of "unknown" blacks reported that the use of reference blacks is most desirable. The task group recommended that in the proposed method for the testing of blacks in rubbers, the use of reference blacks should be spelled out.

Joins Hull as Vice-President

Frank Crampton

Hull Corp., Abington, Penna., has announced that Frank Crampton has become associated with the corporation as vice-president in charge of sales. Mr. Crampton's experience includes twelve years as field sales manager on high vacuum equipment, pharmaceutical equipment and plastics molding presses with the F. J. Stokes Machine Co., Philadelphia, Penna.; fourteen years as product sales manager with Dewey and Almy Chemical Co., Cambridge, Mass.; and three years as truck tire sales manager, Boston branch of the Firestone Tire and Rubber Co. He is a graduate of M.I.T. in engineering administration.

Another task group assigned the problem of attempting to vary the mill mixing procedure and the Banbury procedure to obtain closer agreement reported that their study which involved temperature variations only failed to show how this could be done. However, in view of the report of the first task group on the employment of reference blacks, it was felt that it was unnecessary to pursue this problem further.

A third task group had been working on a series of changes which are now required in D-15. These embody changes to bring the reference materials up to date, the addition of one new recipe (the ACS No. 1 recipe for testing material rubber) and numerous other minor changes which have become apparent as the result of experience with the method. These proposed changes are to be letter balloted in the subcommittee.

An attempt will be made by this subcommittee to develop procedures for compounding, mixing, etc., for the synthetic rubbers as a replacement or continuation of the FFC procedures. These will be worked out in cooperation with subcommittee 13 and may be either incorporated in D-15 or a separate method.

Technical Committee on Automotive Rubber (J. J. Allen, Firestone, Secretary): The following actions have been taken: (1) The round-robin tests on duplicability of results of tests with the Yerzeley Oscillograph have been completed. The technical committee has recommended to ASTM subcommittee 27 that D-945-52T be revised to show the degrees of accuracy normally to be expected. These are as follows: Resilience, ±0.15% (example 80.3-80.6); static modulus ±5 psi; dynamic modulus-compression, ±25 psi; shear ±10 psi; (2) Several changes in SAE 20R Coolant Hose specification have been approved by section 3 and are now sent to letter ballot of Tech. A. They include a condensation of the various tables into one table; some changes and additions to sizes and bursting strength requirements; also some recording of the titles and scopes of the various types of hose; (3) by letter ballot of the technical committee, ASTM Committee D-11 will be asked to approve a revision of D-1171-51T to provide an alternative procedure measuring and reporting to quality retention values of rubber compounds after exposure to weather aging.

Article on Michelin Company

The June, 1956, issue of *Reader's Digest* published a condensation of an interesting article on the inception and development of the Michelin Tire Co., France. The $14,000,000 company, employing 15,000 workers in the mother plant in France and about as many in other European countries, is said to be the largest tire manufacturer in Europe. It produces half of all tires sold in France, and nearly one-third of those sold elsewhere in West Europe. Michelin has plants in Italy, England, Belgium, Holland, Spain and Argentina.

THREE PROMOTIONS ANNOUNCED BY ELASTOMERS DIVISION OF DUPONT

R. B. Shaver

F. G. Falvey

D. H. Lutz

Three promotions have been announced by the Elastomers Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Richard B. Shaver, sales assistant in Wilmington, has been appointed technical sales representative assigned to the Chicago district. Francis G. Falvey of the Elastomers Laboratory at Chestnut Run has been named technical sales representative for the Akron district, with headquarters in Detroit. Donald H. Lutz, also of the Chestnut Run Laboratory, transfers to the Eastern district office at Trenton, N. J., as sales administrative assistant.

Mr. Shaver hails from Fredonia, N. Y., and received his bachelor of science degree in chemical engineering from Clarkson College of Technology, Potsdam, N. Y., in 1950. From 1950 until 1953 he was employed by Gates Rubber Co., Denver, Colo., where he engaged in tire development and sales work. In 1954 he joined DuPont as a compounder at the Rubber Laboratory in Deepwater Point, N. J. He was transferred to the Wilmington office as sales administrative assistant in 1955.

Mr. Falvey, born in Newton, Mass., received his bachelor of science degree in chemistry in 1949 and his master's degree in chemistry in 1951, both from Boston College. He joined DuPont in 1951 as a development chemist for the plant technical section at the firm's Chamber Works at Deepwater Point. Early in 1954 he was transferred to the Rubber Laboratory there, where he worked as a compounder.

A native of Pittsburgh, Penna., Mr. Lutz was graduated from Pennsylvania State University in 1952 with a bachelor of science degree in biological chemistry. Following graduation he was employed by the Firestone Tire & Rubber Co., as a rubber chemist. In 1954 he became a compounder at the DuPont Rubber Laboratory.

F.T.C. Appeals Trust Ruling

The Supreme Court has agreed to consider a Chicago court ruling handed down in the case that arose from Federal Trade Commission complaints that the National Lead Co., New York, N. Y., the Sherwin-Williams Co., Cleveland, Ohio, and the Eagle-Picher Co., Cincinnati, Ohio, violated Federal anti-trust laws by conspiring to restrain competition in the sale of lead pigments. The Federal Trade Commission says the ruling makes it difficult to enforce anti-trust laws. Arguments on the case will be heard next fall. Later, the court will hand down a written opinion.

The F. T. C. said the companies divided the country into zones and charged the same delivered price to all buyers in a single zone. The commission ordered the companies to cease this practice both as a group and individually. The Seventh Circuit Court of Appeals in Chicago upheld the part of the order directed at the companies as a group. But it struck down the part requiring each individual company to give up the zone delivery system. Appealing to the Supreme Court, the government argued that "the Commission has wide discretion in fashioning the remedy it deems necessary" to prevent violations of the law. The companies appealed separately the part of the Chicago court ruling applying to group action. The court rejected this appeal.

Goshen Rubber Enlarges Plant

A plant enlargement and modernizing program costing approximately $500,000 is being completed by Goshen Rubber Co., Inc., Goshen, Ind. Recent improvements include construction to increase floor space by 24,000 square feet, extensive additions to molding, processing and power-plant equipment, and doubling of silicone product fabricating capacity. Elmo E. Niccum, president, states that these facilities are part of a continuing program designed to maintain leadership in serving the market for custom-fabricated products of natural, synthetic and silicone rubber compounds through efficient, automated processing at high quality and increased volume levels.

Faultless Purchases Foremost

Faultless Rubber Co., Ashland, Ohio, has announced the purchase of all the assets of the Foremost Rubber Co., Ashland. Transfer of the assets is planned for July. After the acquisition, Foremost will be known as the Foremost Division, Faultless Rubber Co. This division will manufacture toy balloons and will develop and supply specialized rubber items in the pharmaceutical industry. The new division will be located at a new plant recently completed on a seven-acre site along the Erie Railroad. The Foremost firm was incorporated a few months ago by a group that purchased the assets of the former Toycraft Rubber Co.

RMA MECHANICAL GOODS SUBDIVISION HOLDS ITS ANNUAL MEETING

Approximately 50 members and guests attended the 1956 Annual Meeting of the Molded, Extruded, Lathe Cut and Chemically-Blown Sponge Rubber Subdivision of the Mechanical Division of the Rubber Manufacturers Association which was held at The Homestead in Hot Springs, Virginia from June 28 to 30. The meeting featured the presentation of eight papers as well as the Annual Dinner and a Golf Tournament. Considerable discussion marked the presentation of the various papers.

The meeting was under the general supervision of Pierce Sperry, (Sperry Rubber & Plastics), Chairman of the Subdivision, who was assisted by J. J. Catterall, Secretary of the RMA Mechanical Division. In his welcoming address, Mr. Sperry expressed his thanks to the heads of the local membership committees as well as to the members of the Executive Committee of the Subdivision for aiding him in the performance of his duties. He particularly expressed his thanks to Mr. Catterall.

Cost Educational Program

Among the highlights of the three day program was a discussion of an "Analytical Study of the Cost Educational Program" by C. W. Halligan, RMA treasurer, and a report on the "Cooperative Educational Program" by H. C. Dinmore (Tyer Rubber). These were interrelated reports and occasioned considerable discussion.

Actually, both reports stemmed from the work initiated over a year ago on modern cost accounting methods. Some of the results of this work were presented by Mr. Halligan at the 1955 meeting at which time he discussed a cost accounting survey made among 19 member companies. That survey was made to determine the soundness of methods used in calculating product costs and to stir interest in more accurate cost accounting methods.

In the current instance, Mr. Halligan reported on a new series of studies in which member companies were asked to submit estimates on 1000 pieces of a typical molded item. There was a spread of approximately $100.00 between the low and high estimates made on this product indicating that there is considerable work to be done where cost accounting methods are concerned if some rubber manufacturers want to successfully compete on closed bids. It was emphasized that some of the companies involved in the "bidding" were actually unfamiliar with the product concerned, which might account in part for the wide differential.

As a result of this latest survey, as well as a number of meetings which have been held during the past year, it has been decided to divide future studies into five specific categories, namely: (1) Molded Goods, (2) Rubber-to-Metal, (3) Extruded Goods, (4) Sponge Products, (5) Lathe and Die-Cut Goods.

In concluding his report, Mr. Halligan made it clear that all surveys conducted to date indicated that a proper interpretation of specifications as well as a common terminology for such specifications is definitely required. He also stated that packaging costs involved in the packing and shipping of finished products were an important factor in cost estimating and warranted detailed study.

Report on Committee Activity

Mr. Dinmore's talk was actually in the form of an interim report on the "Cooperative Educational Program". Referring to the series of meetings held on this subject during the past year, he stated that there obviously was a real desire and need throughout the rubber manufacturing industry for agreement on certain standards of performance and means of conveying this information to customers. In view of this situation, the Cooperative Educational Committee has established as its ultimate objective the publication of a brochure covering the various subdivisions of the RMA Mechanical Division which will explain the characteristics of products and set up standards of performance, Mr. Dinmore reported.

Mr. Dinmore reported that before the brochure could be completed it was necessary that there be mutual agreement on certain facts in various areas, such as: (a) characteristics to be covered; (b) simple descriptions of the standards, and (c) rating of various qualities.

Since the best way to reach the required mutual agreement would be through the means of working committees, four such committees have been organized and are already functioning. The chairmen of these committees are: *Molded Goods and Rubber-to-Metal Parts,* John Gerstenmaier (Goodyear); *Extruded Goods,* Claude Shreiner (Chardon Rubber); *Sponge Rubber,* G. R. Sprague (Goodrich Sponge Rubber Division); *Lathe Cut Goods,* H. W. Osborn (Stalwart Rubber).

As an example of the thinking which is going into this work, Mr. Dinmore read a portion of Mr. Gerstenmaier's report of the first meeting of the working committee on Molded Goods and Rubber-to-Metal Parts. The report indicated that since the brochure to be prepared will be accepted and used by both the customer and vendor of rubber products, the working committee decided that it would investigate six specific areas, as follows: (1) Dimensional tolerances; (2) Relative dimensions (such as concentricity, flatness, parallelism, etc.); (3) Appearance (finishing, manufacturing variation, etc.); (4) Flash extensions; (5) Function of product; (6) Molded to metal products.

Mr. Gerstenmaier's report also disclosed that as a first approach, his committee would attempt to develop a descriptive section for the brochure which would explain the various manufacturing procedures and difficulties, and thereby outline the advantage of exact specifications in regard to the category. The next portion would be a suggestion on how to specify the quality level. This would be in graph form, class nomenclature, pictures or description, the speaker said.

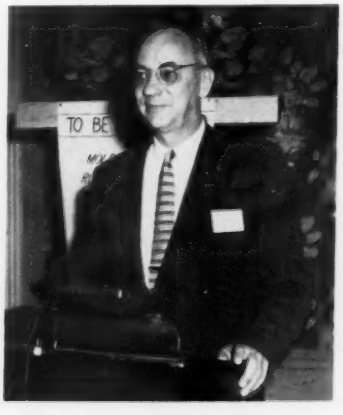
Mr. Dinmore made it clear that all of the working committees involved will hold meetings during the coming year and he expressed the hope that all of the work will be completed so that a comprehensive presentation may be made at the 1957 Annual Meeting of the Subdivision. He emphasized the point that once completed the brochure would be as valuable a tool to design engineers as are the ASTM Material Specification charts; that where quality control engineers are concerned it should

Pierce Sperry

chairman of subdivision who directed the meeting.

C. W. Halligan

addresses meeting on cost educational program.



H. C. Dinmore

speaks on the cooperative educational program.

result in a clearer understanding as to the quality levels to be expected, and finally, that where purchasing agents are concerned it will mean easier evaluation of quotations and greatly lessened chances for disagreement on feature and quality, the speaker observed.

For the record, the members of the Co-operative Educational Committee, in addition to Mr. Dinmore, include the following: C. L. Shreiner (Chardon Rubber), W. J. Blizzard (Firestone), W. S. Daley (Goodrich Sponge), K. N. Carter (Ohio Rubber), Pierce Sperry (Sperry Rubber), H. M. Dyer (Acushnet Process), J. F. Dunnigan (H. O. Canfield), and J. J. Catterall (RMA).

Papers on Synthetic Polymers

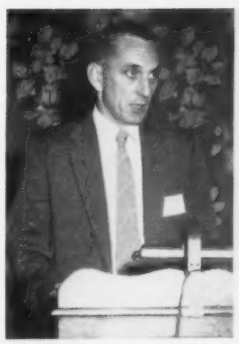
Three of the papers given at the Hot Springs meeting were concerned with synthetic polymers. These included: *"Properties and Application of Coral Rubber—Cis-1,4-Polyisoprene* by G. Alliger (Research Laboratories, Firestone Tire & Rubber Co.); *The Qualities and Usefulness of Butyl Rubber* by J. J. Ernst (Section Head, High Polymer Division, Enjay Laboratories, Inc.), and *New Elastomers* by A. C. Stevenson (Assistant Director, DuPont Elastomers Laboratory).

All three authors discussed the composition, characteristics and applications of the various polymers. Dr. Alliger's talk on Coral rubber was very similar to talks he gave recently before the meetings of the Rubber Chemistry Division of the Chemical Institute of Canada at Montreal and the Rubber and Plastics Division of the American Society of Mechanical Engineers at Cleveland. An abstract of the talk given at the latter meeting will be found elsewhere in this issue.

Mr. Ernst's talk was a comprehensive review of Butyl rubber and at its conclusion he answered a number of previously prepared questions on specific problems, covering both compounding and processing. Much of the data contained in this talk, as well as some of the questions and answers, will be found in the "Symposium on Butyl Rubber" which also appears elsewhere in this issue.

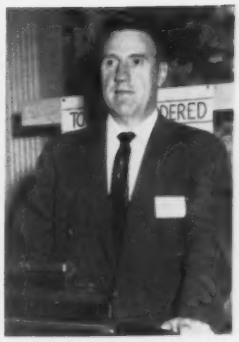
The broad vista of the synthetic polymers was ably covered in Mr. Stevenson's talk on "New Elastomers". In opening his talk, Mr. Stevenson emphasized the point that non-tire uses of rubber in automobiles has been increasing steadily from 1930. In that year, non-tire uses accounted for 175 parts, amounting to 33 pounds. By 1940, this had increased to 267 parts and 57 pounds, and in 1950 to 540 parts and 100 pounds. Most of these non-tire parts are now composed of synthetic polymers.

W. J. Sears
talks on crude rubber quality.



J. L. Ernst

G. Alliger



A. C. Stevenson

The speakers shown above discussed the characteristics and performance of new elastomers.

This talk covered the specific advantages currently offered to the rubber compounder by the various commercially available synthetic rubbers, including neoprene, Hypalon, Butyl rubber, silicone rubbers, nitrile rubbers, acrylic rubbers and the fluororubbers. Among the newer elastomers discussed by the speaker which have not yet been commercially established were Philprene VP and the urethane rubbers. In each case both the present and future potentials of the polymers were stressed.

In discussing the urethane rubbers, which were referred to as "condensation polymers", Mr. Stevenson emphasized the fact that a good deal of the present work on these rubbers is still in the experimental stage. Referring to the outstanding abrasion resistance exhibited by these rubbers, he stated that present experiments indicate that Adiprene B (Duvont's urethane rubber) may give twice the life to tire treads as those containing other synthetic rubbers based on comparable thickness.

He also said that considerable work was being done on fluid urethane rubbers and gave some data on both polyamine and polyglycol curing systems for these rubbers. He emphasized the point that the processing of the fluid urethane rubbers requires no pressure and showed a flow chart of a typical processing system. Where Philprene VP is concerned, he stated that this *cis*-1,4-polybutadiene has good potential in view of its resistance to heat buildup, its good resilience and its low freeze point.

Where some of the other commercial polymers are concerned, the speaker mentioned the improved vulcanization systems which are being developed for Butyl rubber, including those for brominated butyl; the extremely high tensile strength of the nitrile rubbers; the advances made in the silicone rubbers, including the development of vinyl-substituted gums, and the special properties exhibited by both the acrylic rubbers, such as Hycar PA and Vyram, and the fluororubbers, such as Kel-F elastomer and Poly FBA.

Turning to the neoprenes, Mr. Stevenson outlined the outstanding characteristics of these general-purpose polymers, such as their resistance to oxidation, ozone, burning, etc. He stated that neoprene products function at much higher elevated temperatures than indicated by some recently published comparisons of various synthetic polymers. He disclosed that considerable experimental work is being done on both semi-fluid and finely divided neoprenes, the specific advantages of which will be recognized by compounders. He emphasized, however, that this work was largely experimental and only the future will tell what the commercial possibilities of such neoprenes might be.

Mr. Stevenson also outlined the chemical and physical properties of Hypalon and discussed some of the advantages offered by this polymer to the rubber industry. He also showed the formula for a typical Hypalon 20 extrusion stock as well as the physicals of this stock. He implied that several new types of Hypalon can be expected in the near future.

Sears Discusses Natural Rubber

Another highlight of the meeting was a discussion on "Crude Rubber Quality and Availability" by W. J. Sears, vice-president of the Rubber Manufacturers Association. In this talk, the author developed some of the background factors that may influence the future supplies as well as quality of natural rubber. In opening his talk, he stated that in 1955 the production of natural rubber reached a peak of 1,910,000 long tons which was more than twice the production recorded in 1935. Although the United States accounted for more than half of all natural rubber consumed in 1935, we used only about one-third of the world total last year.

Pointing out that world natural rubber production during the 1950-55 period varied only slightly from year to year, Mr. Sears said that current estimates of such production through 1960 show no further increase and, as a matter of fact, some authorities believe the production level will decline due to the probability of lower market prices. He intimated that after 1960 there may be some further increase in natural rubber production when the higher

yielding rubber trees that recently have been planted reach maturity.

According to the speaker, rubber manufacturers in the United States in 1955 used 58.5% synthetic rubber and currently are using over 60% to fulfill their annual requirements. He said that present estimates indicate that this ratio may raise to 65% in the period up to 1960 but that based upon today's knowledge of existing production types of synthetic rubber, it may prove difficult to exceed 65%.

With regard to consumption of synthetic rubber in the rest of the free world, Mr. Sears stated that these countries used only 12% of such rubber during 1955. He added, however, that by 1960 all of these countries must, in the aggregate, increase their synthetic rubber usage to 30% in order to balance the anticipated availability of natural rubber. In his opinion, the further conversion in foreign plants to increase percentages of synthetic rubber of these proportions should not involve difficult technical problems.

The speaker emphasized the fact that American rubber manufacturers, through foreign subsidiaries, affiliates or companies where technical contracts exist, have tremendous influence on rubber consumption outside the United States. He pointed out that of the 127 tire manufacturing plants outside of the United States, exclusive of the communist bloc, 73 had either an ownership, financial or technical connection with American rubber manufacturers. This situation has considerably influenced the growth in synthetic rubber consumption outside of the United States.

Factor in Synthetic Growth

The most important factor in the continued growth of synthetic rubber consumption abroad, according to the RMA executive, is the competitive price of natural rubber. If foreign manufacturers do not increasingly convert to synthetic rubber, they will demand increased supplies of natural rubber to support their expected growth. This would bring them into competition with manufacturers in the United States for the available supplies of natural rubber, the consequences of which may be a further inflation in natural rubber prices, thus recreating the same situation that persuaded foreign countries to increase their synthetic rubber usage during 1955.

Turning back to the natural rubber picture, Mr. Sears pointed out that nearly 60% of the world's 11,250,000 acres of rubber trees are owned by smallholders and that during 1955, fully 45% of the production in Malaya and 68% of the production in Indonesia came from these smallholdings. The vast majority of smallholders' plantings are in low yield, inefficient types of trees forty years or more of age. These old trees may yield from 200 to 300 pounds per acre per year as compared with the latest varieties developed through research which yield more than 2000 pounds per acre per year. Although there are good prospects for increased production on the rubber estates, which run to 100 acres or more in size, the smallholders, with the exception of some local effort in Malaya, are a disorganized group and cannot be relied upon for increased output.

Thomas Receives 40-Year Pin

E. J. Thomas (left), president and chief executive officer of the Goodyear Tire & Rubber Co., completed forty years of service with the company when he received his service emblem from P. W. Litchfield, chairman of the board, at an informal ceremony on May 23 in Akron, Ohio. The forty years Mr. Thomas has been associated with the company climax a climb from stenographer at the age of 17 to president and chief executive of the world's largest rubber company. In presenting the 40-year pin, Mr. Litchfield said, "It is with all sincerity that I wish to extend my warmest congratulations to the man who in Good-

year made the most progress in the history of the company. Here is one of the happiest pin presentations I have made in all my career." The ceremony, held before associates and close friends of Mr. Thomas, was continued with the presentation of numerous gifts from Goodyear personnel throughout the world. "I wish to thank everyone for making this day so memorable. Forty years is a long time, but it seems like only yesterday that I first came to Goodyear," said Mr. Thomas.

Mr. Thomas was born in Akron and joined Goodyear in 1916 as a stenographer at the age of 17. He was named secretary to Mr. Litchfield in 1918, and was promoted to assistant to Mr. Litchfield in 1924. He rose successively to the posts of director of personnel, general superintendent, Akron, managing director of Goodyear-Great Britain, assistant to the president and executive vice-president. He was elected president in 1940, and was announced as chief executive on April 3, 1956.

Indicating that the hope of increased output of natural rubber lies in a substantial replanting program, Mr. Sears used the following figures: A typical 10,000 acre estate may now produce 500 pounds per acre per year or a total of 2232 long tons. The same acreage, if replanted with known varieties, could in seven years time yield four times as much or 8928 long tons per year. Since about 60% of natural rubber costs are in tapping labor, productivity per tapper could be increased four times. Under such circumstances, the per-pound cost of natural rubber could be reduced to a figure far below any foreseeable minimum cost of any type of synthetic rubber, Mr. Sears said.

In concluding his talk, Mr. Sears reviewed some of the advances made in recent years with regard to the quality of natural rubber. He referred to the work done by the RMA in conjunction with rubber organizations throughout the world to reconcile the differences which have existed as to the proper standard for certain rubber grades. He revealed that this work has culminated in the circulation of a new draft publication, dated June 1, 1956, which encompasses practically all of the dry natural rubber grades that are produced and used throughout the world.

This draft publication has been sent to 31 rubber organizations in thirteen different countries seeking support and endorsement. It is hoped that these new international specifications will be published before the end of the current year.

The meeting was rounded out with the presentation of two general papers, one on "The Collapse of Time" by J. Lewis Powell, Program Coordinator, U. S. Department of Defense, and the other on "How to Locate Your Best Markets" by J. H. Caldwell, Managing Editor, *Sales Management*. As indicated by its title, the latter paper was a comprehensive discussion of methods which manufacturers of mechanical rubber goods could use in locating new customers. Among the methods advocated by the speaker were advertising, sales promotion efforts, improved public relations, catalogs and specialized mailing lists.

Mr. Powell's talk was concerned with the need for recognizing the fact that any war held in the future will not have the remotest connection with any of those fought in the past. He emphasized the fact that modern weapons no longer furnish time for obsolete thinking but rather made it necessary for us to outsmart potential enemies by unleashing fettered imaginations. He stressed the fact that we must think in terms of the accelerated technical age in which we live.

The speaker also gave a comprehensive description of the Production Allocation Program under which the Armed Services Procurement Planning Officers, which represent the Army, Navy and Air Force and commonly known as "ASPPOs", are continuously seeking and locating the best sources of military production, developing practical production schedules and reserving production capacity to meet these schedules in the event of war. He urged that every rubber manufacturer register his potential with the Office of the Assistant Secretary of Defense in Washington, D. C., and indicated that he would be glad to furnish further detailed information on this score to any interested manufacturer.

Winners in Golf Tournament

The major prize in the Golf Tournament, which was held on the third day of the meeting, was the Jim Bowman Trophy, donated by the Williams-Bowman Rubber Co. The trophy, a beautiful sterling silver tray, will have the winner's name engraved on it each year and will be held for a full year by each successive winner. Other prizes were given to other winners.

The Jim Bowman Trophy, which was based on low net determined by a special handicap system, went to Robert Sullivan, Jr. (Lavelle Rubber). Second low net honors went to Howard Dodge (General Tire), with low gross to Roger Smith, 16-year old son of Howard Smith (Pawling Rubber), and second low gross to Lugh Johnson (Geauga Industries). The winner in the women's tournament was Mrs. Edith Smith. Mr. Johnson was chairman of the golf arrangements.

NEW JERSEY ZINC ACQUIRES TITANIUM PIGMENT FACILITY

May 1st was an eventful day in the long-range development program of the New Jersey Zinc Co. in that it marked the company's entry into the fast-growing titanium pigments field. The scene was Gloucester City, N. J., where company officials completed negotiations for the acquisition of a plant fully equipped and staffed, and producing titanium dioxide at an annual rate of somewhat over 20,000 tons per year. The transfer was effected with little or no interruption of operations and within hours the company's administrative, production and engineering staffs took the first steps in the execution of well-conceived plans to establish New Jersey Zinc as an important factor in another growth industry. The plant was acquired from the American Cyanamid Co.

One of the first steps in the company's program will center on plant expansion. With the demand for titanium dioxide continuing to grow, the company is anxious to increase its production capacity and, in addition to enlarging existing facilities, it has plans for the construction of a new plant.

The Gloucester City plant has ample room for expansion in its 57 acres. Shown above is the main office building with plant buildings in the background.

Raw Materials Plentiful

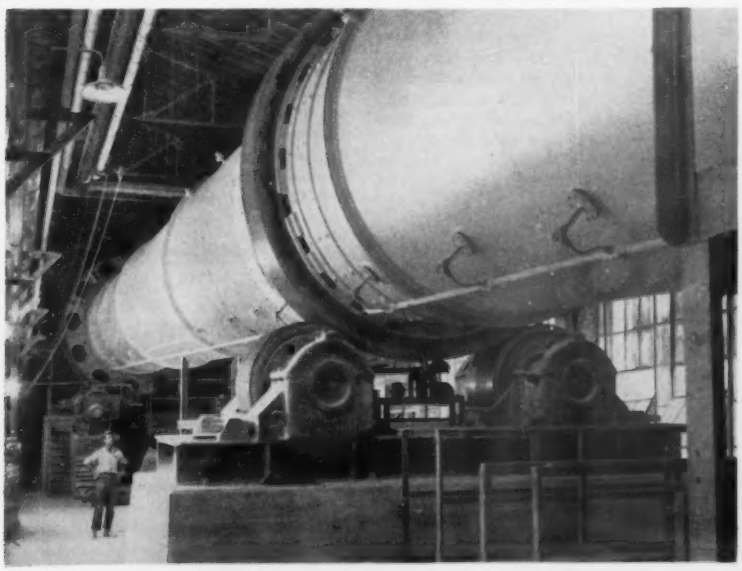
The company is in a most advantageous position from the standpoint of supplies of raw material for its new products. It owns a one-third interest in one of the largest titanium ore deposits in North America, located in eastern Quebec, Canada. The ore from this mine is processed into titanium slag—raw material for titanium dioxide manufacture—at a smelter in Sorel, Quebec, on the St. Lawrence River, from which it is shipped by boat to Gloucester City.

So rapid has been the growth of titanium dioxide that the rubber, paint, paper, ceramic, pharmaceutical and other industries consumed approximately 400,000 tons of the pigment in 1955, as compared with 300,000 tons in 1950.

Titanium dioxide, in addition to its extreme whiteness, is the highest hiding white pigment known and because of this finds widespread use as a pigment for interior and exterior paints. The rubber industry uses the pigment for its whitening properties in a wide variety of rubber goods and in white sidewall tires which are becoming increasingly popular. In paper manufacture, titanium dioxide is extremely useful in providing necessary opacity.

The sale of the new product will require no expansion of the company's present sales organization because titanium dioxide is also required by most of the customers who have been using zinc oxide. Sales representatives welcome the addition to the "Horse Head" line of white pigments since the two types of pigments are not competitive in the majority of applications. The properties of titanium dioxide complement those of zinc oxide in the largest field of application—the paint industry.

A comprehensive advertising program to introduce the new product to industry is already under way. The company announced that at present nine grades of its titanium dioxide are available, and that it is now making shipments in limited quantities. Other pigment grades will be added to the line in the near future.



An important step in titanium dioxide production is performed in the 150-foot rotary kiln shown above. It is in this calcining operation essential pigment properties are developed.

Forms Vinyl Dispersions Group

The formation of a Vinyl Dispersions Division within the framework of The Society of the Plastics Industry, Inc., has been announced. According to William T. Cruse, executive vice-president of SPI, the new Vinyl Dispersions Division has been formed to bring about stable, well integrated growth in the vinyl dispersions industry; to develop specifications, physical test procedures, and performance standards on vinyl dispersions for eventual adoption by the industry; and to evolve standards covering vinyl dispersions used for both industrial and consumer applications. Mr. Cruse stated that the new SPI Division will also devote its efforts toward collecting and disseminating statistics and other important scientific and engineering information on vinyl dispersions, as well as giving careful consideration and expression of opinion on any questions affecting the industry or the public interest.

Executive committee for the Vinyl Dispersions Division is as follows: *Chairman*, James Hull (Reynolds Chemical); *Vice-Chairman*, Audley Clarke (Chemical Products); *Treasurer*, J. M. Perone (Wooster Finishes); Arthur B. Sherry (Stanley Chemical), and Walter J. Kaufman (Watson-Standard Co.) are delegates at large.

Topcik Named Chief Chemist

Barry Topcik has been appointed chief chemist of the Rubber Division of the Eberhard Faber Pencil Co., at the Newark, N. J., plant. Mr. Topcik had been development engineer for the U. S. Rubber Co. at the Passaic, N. J., plant. He was previously with Bell Telephone.

Names in the News

ROBERT D. THOMAS, formerly sales manager of the Central Division of the Firestone Tire & Rubber Co., Akron, Ohio, has been named manager of the Tire Sales Department.

BRUCE K. BROWN, currently president of Pan-Am Southern Corp., has been elected president of Petroleum Chemicals, Inc., New Orleans, La.

CLAUD BROWN has been elected a vice-president of Interchemical Corp., New York, N. Y., and will continue to hold the office of treasurer.

THOMAS G. MACGOWAN, formerly manager of the Marketing Research Department, Firestone Tire & Rubber Co., Akron, Ohio, has been appointed director of advance planning.

A. N. WOHLWEND, previously associated with the Stauffer Chemical Co., has been named director of commercial development for the Escambia Bay Chemical Corp., Cambridge, Mass., with headquarters in New York City.

WILLIAM S. RICHARDSON, president of the B. F. Goodrich Co., Akron, Ohio, has been elected chairman of the National Highway Users Conference.

PAUL J. SANDRIDGE, assistant sales manager of special accounts for the Mansfield Tire & Rubber Co., has been named manager succeeding C. A. Eaves, Jr., who has accepted a sales position with Goodyear.

P. DUDLEY KALEY, formerly manager of fiber glass textile sales in New York City for the Fiber Glass Division of the Pittsburgh Plate Glass Co., has been named sales manager of the division.

DONALD J. BELAIR has been named sales manager and elected to the board of directors of Rempel Manufacturing, Inc. He started with the company in 1947.

BEN H. DAVIS, vice-president of the Standard Machinery Co. and head of the Davis-Standard Sales Corp., has left for Europe on a visit to manufacturers in the plastics and wire fields.

STANLEY W. BENNET, formerly associated with the Compo Shoe Machinery Corp., has been appointed sales manager of the Beebe Rubber Co., Nashua, N. H.

LELAND E. SPENCER, vice-president of the Goodyear Tire & Rubber Co., was recently honored by the company on his completion of thirty years of service.

WALTER M. YOUNG, associated with the Richardson Scale Co. since 1948, has been named director of sales.

P. JAMES UNDERWOOD, for the past three years executive secretary of the Society of Plastics Engineers, Inc., has resigned his post.

R. F. TURNER, associated with the Philip Carey Mfg. Co. since 1934, has been appointed to the newly-established position of sales promotion manager.

LEONARD K. FIRESTONE, president of the Firestone Tire & Rubber Co., of California, has teamed up with two of the country's top comedians to operate a grapefruit ranch in the Indio, Calif., area.

JOHN ALBERT SMITH, for the past nineteen years engaged as a hydraulic engineering specialist and design engineer, has joined the Hull-Standard Corp. as engineer in charge of semi-automatic presses.

SIDNEY PINHASIK, formerly associated with Armour & Co., has joined the laboratory staff of the Resinous-Reslac Department of the Chemical Division, Borden Co.

E. WILLIAM EIPPER, associated with the Stauffer Chemical Co. since 1954, has been named director of the Market Development Department.

T. W. SHARP, formerly manager of the Flexible Packaging Materials Division of the Bakelite Co., has been named manager of the Industrial Products Department.

ROBERT H. WISE, formerly assistant comptroller of Goodrich-Gulf Chemicals, Inc., has been named comptroller.

EDWIN J. THOMAS, president of the Goodyear Tire & Rubber Co., was presented with scouting's highest award, the "Silver Buffalo," at the 46th annual meeting of the National Council of the Boy Scouts of America, held recently in Cincinnati.

HERMAN BEHME, associated with the Stauffer Chemical Co. since 1951, has been appointed to the post of eastern manager of the Market Development Department.

WALTER A. HAZLETT, vice-president of the Goodyear Tire & Rubber Co. handling special assignments, was recently honored by the company for a half-century of service.

MORRIS A. KIMMEL has been appointed executive assistant to the general manager of the Resinous-Reslac Department of the Chemical Division, Borden Co. He has been associated with the operation since 1941.

DR. HOWARD O. MCMAHON, science director of Arthur D. Little, Inc., has been elected vice-president of the company.

Handley Promoted by Firestone

Ernest T. Handley

Appointment of Ernest T. Handley as executive vice-president of the Firestone Plastics Co., Pottstown, Penna., has been announced by Roger S. Firestone, president. Mr. Firestone is also a director of the parent company, the Firestone Tire & Rubber Co. Mr. Handley has been vice-president in charge of production of Firestone Plastics and continues as general manager of the Pottstown plant which is a large tire-producing unit of the company, as well as of chemicals and plastics. Mr. Firestone also disclosed the appointment of Frank J. Groten as vice-president in charge of chemical sales and Kenneth L. Edgar as vice-president in charge of velon sales. Mr. Groten and Mr. Edgar have been sales managers for these product divisions. Mr. Handley joined the Firestone Co. in 1927 and has been a production executive at Firestone tire factories in South America, Europe and the United States. He has been associated with Firestone Plastics since 1948. Mr. Groten has been with Firestone since 1941 as manager of plastics laboratories and has been general manager of chemical sales since 1949. Mr. Edgar joined the company in 1940, engaged in development work for the Firestone Industrial Products Co. at Akron, Ohio. In 1945 he became associated with Firestone Plastics and has been general sales manager of velon products since 1952.

H. D. "JUDGE" FOSTER, sales manager of the Industrial Products Division, Goodyear Tire & Rubber Co., retired on May 31 after 43 years of service.

C. E. YERKEY, associated with the B. F. Goodrich Co. since 1933, has been named department manager of international manufacturing and technical services for the International B. F. Goodrich Co., Akron, Ohio.

FRED W. CLIMER, vice-president in charge of industrial relations for the Goodyear Tire & Rubber Co., retired on May 31 after completing 39 years of service with the company.

Kipp Named to New Post

Robert F. Kipp

Robert F. Kipp, formerly an assistant to the advertising manager, has been named to head sales promotion in the rubber industry for Oakite Products, Inc., New York, N. Y. The company manufactures cleaning and descaling compounds and equipment. Mr. Kipp joined Oakite in 1946. Educated at George Washington and Columbia Universities, he is a member of the American Pulp and Paper Mill Superintendents Association.

Thiokol to Market Butyl

According to a recent announcement, Thiokol Chemical Corp., Trenton, N. J., will market Butyl rubber. Thiokol is entering the Butyl rubber field in cooperation with Petroleum Chemicals Inc., a company jointly owned by the Continental Oil Co. and Cities Service Co. Petroleum Chemicals presently operates a butadiene plant at Lake Charles, La., and is a licensee under the Esso Research and Engineering Co. for the manufacture of Butyl rubber. Thiokol is establishing a sales, research and development laboratory at its Trenton works to study and develop wider uses for Butyl rubber. Activities will encompass selling, research and the development of new uses for Butyl. Thiokol also will operate a sales-service laboratory to assist purchasers in the utilization of this type of synthetic rubber.

Elects Three New Directors

Columbia-Southern Chemical Corp., Pittsburgh, Penna., a wholly-owned subsidiary of the Pittsburgh Plate Glass Co., has elected three new directors and increased the number of board members from 11 to 14. The three new directors are C. F. Bingham, vice-president of sales for Columbia-Southern; W. E. Phillips, a director of Pittsburgh Plate since 1950 and board chairman and chief executive officer of Canadian Pittsburgh Industries Ltd., a wholly-owned subsidiary of Pittsburgh Plate; and H. B. Brown, a director of Pittsburgh Plate since 1944 and secretary of the firm since 1939.

New Thermoid Appointments

Warren E. Hill, president of the Thermoid Co., Trenton, N. J., has announced the appointment of Charles M. Scholz as general manager of the Rubber Division. Mr. Scholz is a vice-president of the company and is continuing as director of marketing for all divisions and subsidiaries. Mr. Scholz joined Thermoid as assistant to the manager, Industrial Rubber Division, in August, 1954. He was later named assistant to the president and director of marketing, and was made a vice-president in May, 1956. His earlier rubber experience included that of sales manager of hose and miscellaneous products at Pioneer Rubber Mills, San Francisco, Calif., and prior to that, sales development in the Industrial Products Division of B. F. Goodrich, Akron, Ohio.

The appointment of John A. Muller as director of research and development has also been announced by the company. Mr. Muller joined Thermoid in 1943 and was formerly executive engineer and technical manager, consecutively, of the Industrial Rubber Division. He laid out the general plant design and equipment for the Thermoid Western factory at Nephi, Utah, and supervised installation at that plant. Prior to associating with Thermoid, Mr. Muller was employed by the U. S. Rubber Co. where he was head of Mechanical New Products Development. He is a graduate of the Newark College of Engineering.

Discusses Foreign Licensing

In a panel discussion at a recent American Patent Law meeting in Cleveland, Ohio, A. L. Freedlander, president of the Dayton Rubber Co., Dayton, Ohio, expressed the opinion that any company which has licensing arrangements abroad under patents should be prepared to supply the technical assistance to implement the patents. He pointed out that Dayton Rubber supplies everything from advice on plant locations and building blueprints to the latest developments in rubber products, compounds and manufacturing techniques. The Foreign Technical Service Division, now operating in Europe, the Near East and South America, supplies monthly surveys of patents as they are issued in the United States pertaining to rubber products and reports and data from various engineering and scientific societies. Dayton Rubber operates its foreign service on a fee basis, exercising no control over operations of the foreign plants, Mr. Freedlander stated.

Permacel Tape Acquires Le Page's

Le Page's, Inc., Gloucester, Mass., has been acquired by the Permacel Tape Corp., New Brunswick, N. J., a wholly-owned subsidiary of Johnson & Johnson. In addition to its plant in Gloucester, Le Page's has plants at Decatur, Ill., Baltimore, Md., and Toronto, Canada. Le Page's will be operated as a separate company with its own management.

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Tweed Joins Federal Rubber

Fred G. Tweed

Robert M. Fredricks Corp., Woodside, N. Y., has expanded their rubber operations to include the Federal Rubber Manufacturing Division, a new rubber molding plant, to better service metropolitan manufacturers and engineering firms. They have acquired the services of Fred G. Tweed, who has long and varied experience in the rubber field, as plant manager. The firm specializes in prototype work as well as production runs, in rubber, synthetic rubber, sponge, hard rubber and silicones.

Offers Consulting Service

Tenney Engineering, Inc., 1090 Springfield Road, Union, N. J., has announced the establishment of a separate engineering section (ES-10) that will offer consultation services on the design and manufacture of new environmental test chambers and the modification of existing equipment. Robert H. Brown, vice-president, has been named head of this new section. Tenney engineers will help solve highly specialized problems such as extra-high temperature requirements in the range of 1,000°F., the cooling of ram jet engines and associated equipment, simulation of extreme low temperature arctic conditions, extreme rates of evacuation, control flow rates simulating air cooling systems, altitude simulation pressures in the range of 300,000 feet and similar problems. Tenney also offers environmental engineering consultation concerning complex missile evaluation and theory.

Interchemical Acquires Angier

Interchemical Corp., New York, N. Y., has acquired the industrial adhesives business of Angier Products, Inc. The acquisition involves the transfer of the Angier manufacturing facilities and other properties in exchange for Interchemical stock. Angier is a manufacturer of industrial adhesives with plants in Cambridge, Mass., and Huntington, Ind. It was founded in Cambridge in 1931 by the late Donald Angier. Angier will operate as Angier Adhesives Division of Interchemical with its present management and staff. Henry S. Bothfild, president of Angier, will become division president of the new Interchemical unit.

Financial News

Armstrong Rubber Co.

Six Months to April 1: Net income of $854,869, which is equal to $1.46 a common share, compared with $975,100, or $1.63 a common share after preferred dividends, in the comparable period of the preceding year. Net sales totaled $28,906,239, against $29,851,072 in the same period of 1955. Results do not include operations of the Armstrong Tire & Rubber Co., Natchez, Miss., 50% owned affiliate, and the Copolymer Rubber & Chemical Corp., 28.6% owned.

St. Joseph Lead Co.

Quarter to March 31: Net income of $2,945,748, which is equal to $1.08 a share, compared with $3,369,616, or $1.24 a share, in the first three months of 1955. Net sales were $29,104,695, against $31,723,474 in the first quarter of 1955. The decline in earning was attributed to the drop in tonnage of lead sold, although metal prices were higher and zinc sales increased.

Dayton Rubber Co.

Six Months to April 30: Net profit of $1,093,299, which is equal to $1.49 per common share, compared with $963,558, or $1.42 per common share, in the corresponding period of the preceding year. Net sales amounted to $34,321,742, against $30,417,721 in the same six month period of 1955.

Columbian Carbon Co.

Quarter to March 31: Net profit of $1,761,453, which is equal to $1.09 per share, compared with $1,661,266, or $1.03 per share, in the corresponding period of the preceding year. Sales totaled $16,756,550, against $15,409,371 in the first quarter of 1955.

General Tire & Rubber Co.

Quarter to February 29: Net income of $2,273,240, which is equal to $1.40 a common share, compared with $2,236,310 in the corresponding period of the preceding year. Net sales rose to $83,523,606, against $63,574,232 in the opening quarter of 1955.

Rome Cable Corp.

Year Ended March 31: Net income of $2,023,070, which is equal to $3.82 a share compared with $930,879, or $1.81 a share, in 1955. Net sales totaled $56,996,682, against $39,186,095 a year ago.

Belden Manufacturing Co.

For 1955: Net income of $1,582,203, which is equal to $4.09 a share, compared with $1,085,361, or $3.39 a share, in the preceding year.

Mansfield Tire & Rubber Co.

Quarter to March 31: Net income of $309,202, which is equal to 49c per common share, compared with $534,610, or 97c per common share, in the comparable period of the previous year. Net sales amounted to $14,794,483, against $18,416,794 in the same quarter of 1955. James H. Hoffman, president, attributed a substantial part of the first quarter decline to placing in operation certain new plant facilities.

A. G. Spalding & Bros.

Six Months to April 30: Net income of $155,000, which is equal to 27c per share, compared with $320,000, or 59c per share, in the corresponding period of 1955. The 1956 figures include earnings of the Rawlings Division from December 9, 1955, date of acquisition, and reflects expenses of about $350,000 before taxes, related to the acquisition, according to Walter B. Gerould, president.

Midwest Rubber Reclaiming Co.

Six Months to April 30: Net income of $405,512, which is equal to $1.33 a common share, compared with $402,385, or $1.31 a common share, in the corresponding period of the preceding year. Net sales totaled $4,775,804, against $4,418,417 in the six month period ending April 30 1955.

Minnesota Mining & Mfg. Co.

Quarter to March 31: Net income of $8,632,518, which is equal to $1.04 a common share, compared with $7,452,170, or 91c a common share, in the first quarter of the previous year. Net sales amounted to $75,706,190, against $63,382,846 in the corresponding period of 1955.

Sheller Manufacturing Corp.

Quarter to March 31: Net profit of $573,309, which is equal to 60c a share, compared with $880,488, or 92c a share, in the corresponding period of the preceding year. Net sales amounted to $12,194,583, against $13,854,475 in the first quarter of 1955.

O'Sullivan Rubber Corp.

Quarter to March 31: Net income of $10,157 compared with $31,678 in the corresponding period of the preceding year. Sales amounted to $1,685,000, against $1,731,000 in the first quarter of 1955.

Ansonia Wire & Cable Co.

Quarter to January 31: Net income of $70,036, which is equal to 66c a share, compared with a net loss of $24,388 in the corresponding period of the preceding year.

Firestone Tire & Rubber Co.

Six Months to April 30: Net income of $27,140,605, which is equal to $3.33 per common share, compared with $22,330,210, or $2.76 per common share, in the comparable period of 1955. Net sales amounted to $532,070,658, against $519,508,494 in the six months period ending April 30, 1955. Provision of $27,800,000 has been made for federal, state and foreign taxes on income as compared with $24,200,000 for last year.

Lee Rubber & Tire Corp.

Six Months to April 30: Net income of $736,495, which is equal to 86c per share, compared with $657,100, or 77c per share, in the corresponding period of the preceding year. Net sales totaled $21,487,434, against $19,819,617 in the same period of 1955.

Goodall Rubber Co.

Quarter to March 31: Net income of $158,710, which is equal to $1.01 a common share, compared with $92,542, or 65c a common share, in the corresponding period of the preceding year. Net sales totaled $2,923,539, against $2,137,356 in the first quarter of 1955.

Stauffer Chemical Co.

Quarter to March 31: Net income of $3,013,000, which is equal to 99c per share, compared with $2,519,000, or 83c per share, in the corresponding period of the preceding year. Net sales totaled $36,513,000, against $31,638,000 in the first quarter of 1955.

Okonite Company

For 1955: Net income of $1,559,497, which is equal to $8.18 a share, compared with $1,171,899, or $6.54 a share in 1954. Net sales in 1955 amounted to $43,452,371, against $34,783,093 in the preceding year.

DeVilbiss Company

For 1955: Net income of $1,482,616, which is equal to $4.01 a share, compared with $786,197, or $2.10 a share in 1954. Net sales amounted to $20,071,418, against $17,570,342 in the preceding year.

Canadian Tire Corp., Ltd.

For 1955: Net income of $1,250,061, which is equal to $11.68 per share of common stock, compared with $999,595, or $9.06 per share of common stock, in the corresponding period of 1955.

Servus Rubber Co.

Year Ended February 29: Net income of $352,281, which is equal to 92c per share, compared with $105,176, or 27c per share, in 1955.

Canada Wire & Cable Co.

For 1955: Net income of $2,037,019, which is equal to $9.88 a share, compared with $1,344,413, or $6.52 a share, in the preceding year.

Firestone Promotes Riley

Richard A. Riley

Appointment of Richard A. Riley as general manager of the World Bestos Division of the Firestone Tire & Rubber Co., has been announced by Lee R. Jackson, president of Firestone. The World Bestos Division, located in New Castle, Ind., manufactures automotive brake lining, industrial friction materials, molded rubber goods, asbestos sheet packing and other products made of rubber and asbestos. Mr. Riley has been assistant general manager of the division. He succeeds the late William J. Nanfeldt as general manager. A native of Fall River, Mass., and a graduate of Providence College in R. I., Mr. Riley joined Firestone in 1939 as a factory accountant in the company's Fall River plant. He later became manager of the Sales Accounting Department there. In 1942, Mr. Riley was named comptroller of the World Bestos Division, then located in Paterson, N. J. He moved to New Castle when the plant operation was transferred there in 1945.

Kel-F Elastomer Prices Reduced

Price reductions of more than 30% on its fluorocarbon rubbers have been announced by the M. W. Kellogg Co. This price reduction, the first since introduction of this material two years ago, became effective June 1, 1956. Kel-F elastomer was previously priced at an introductory $25 per pound. The new price schedule for the two commercial grades, available in compressed bales of raw gum, starts with a new base price of $15.00 per pound and is on a sliding scale depending on quantity ordered. The new price per pound schedule for the elastomer is: $16.00 in 1-99 pound lots; $15.50 for 100-1,990 pound orders; and $15.00 for orders of 2,000 pounds and over. According to Walter J. Merck, manager of sales for the Chemical Manufacturing Division, the price reduction was made possible by increasing acceptance of this fluorocarbon rubber by industry. Applications range from bungs and seals in beer barrels to fuel cells and containers in guided missiles.

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Enters Isocyanate Foam Field

General Latex and Chemical Corp., Cambridge, Mass., has announced its entry into the isocyanate foam field as a supplier of "Vultex" isocyanate foam compounds. Both rigid and resilient foam can be made from the products offered, enabling manufacturers to foam in place by appropriate mixing of such materials. Engineering assistance for the techniques of the mixing operations is also offered. The compounds are in two parts, and when blended together result in the formation of carbon dioxide as the expanding agent. Formulations to give different densities, hardness and resiliency are available. Specially processed diisocyanates which have been chemically reacted by condensation reactions with resins or polyols are used in these compounds. The products, therefore, have reduced toxic effects, since the volatility of the diisocyanates has been reduced, the company claims. Foaming and curing take place after mixing the condensed product with a catalyst, the fluid mass being rendered solid in a short time. Low temperature heat application may be used to expedite this curing step. Foams so produced are said to have excellent solvent resistance, low flammability, low reactivity with oxygen, high tensile and excellent insulation properties. Products of low density, about three pounds per cubic foot, may be produced, which may be cored in a manner associated with latex foam products.

Taft Joins Olin Mathieson

William K. Taft, formerly manager of the Government laboratories in Akron, Ohio, operated by the University of Akron for the National Science Foundation, joined the Aviation Division of Olin Mathieson Chemical Corp. in a research capacity on July 1. Joining Mr. Taft in the move to Olin Mathieson will be the following members of the Akron laboratories' technical staff: Trescott B. Larcher, Wallace R. Mitten, A. D. Snyder, Dorothy C. Prem, June T. Duke, Norman S. Trommer and Erwin Kniel. The group will be located at the Olin Mathieson research laboratories at Niagara Falls. Mr. Taft is a chemical engineering graduate of the Massachusetts Institute of Technology. His industrial experience has been in the fields of sugar and tanning materials and for the past thirteen years in the government synthetic rubber program. He is a member of the American Chemical Society and its Rubber Division. The scientists accompanying Mr. Taft have been engaged in research and development in the field of polymerization and high polymers at the Government laboratories. The group will continue to work along related lines for Olin Mathieson.

Vapor Heating Acquires Roth

Vapor Heating Corp., Chicago, Ill., has acquired the Roth Rubber Co., Cicero, Ill., through an exchange of stock. Roth stockholders will receive eight shares of Vapor common stock in exchange for each share of Roth Rubber stock. Roth, which employs about 100 workers, will be operated as a division of Vapor Heating.

Fialla Joins Columbian Carbon

Dr. Rolf Fialla

Dr. Rolf Fialla has been appointed European technical service director of Columbian Carbon Co., New York, N. Y. From headquarters in Zurich, Switzerland, he will use his long experience in the rubber industry to bring latest American techniques to European manufacturers in the use of the company's products. His activities will extend throughout the European rubber industry. Holder of the doctor's degree in Chemical Engineering from the Technical Institute of Vienna, Dr. Fialla comes to Columbian from many years with Semperit, Vienna. In 1951-52 he was in the United States as official representative of the Austrian rubber industry under the Marshall plan.

Drafts Rubber Replanting Act

The Thai Cabinet has approved in principle the draft of a Rubber Replanting Fund Act. Under this act, exporters would pay a tax based on the market price of rubber. The income thus obtained would be put in a special fund to be used in aiding rubber producers to replace old, damaged, or low-yielding trees with high-yielding trees. Five percent of the income is to be used by the Ministry of Agriculture for research and development of high-yielding material, while the small plantations (less than 20 acres) would get 75% of the remaining funds. The Rubber Division of the Thai Ministry of Agriculture states that, according to its preliminary estimates, about one-fourth of Thailand's rubber trees should be replaced in order to improve yield and quality.

Named Circle Wire Directors

Harry W. Goodman, George Jacobs and A. Russell Merz have been elected directors of the Circle Wire & Cable Corp., Maspeth, N. Y., a subsidiary of the Cerro de Pásco Corp., New York, N. Y. Mr. Goodman and Mr. Jacobs are vice-president and treasurer, respectively, of the subsidiary. Mr. Merz is vice-president of sales, purchases and personnel for the parent company.

Keen Named to New Post

W. Newlin Keen

W. Newlin Keen has been appointed assistant manager of the Akron district sales office of the Elastomers Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. He succeeds R. F. Harwick, who transferred to the Petroleum Chemicals Division. A native of Wilmington, Del., Mr. Keen received his bachelor of mechanical engineering degree from the University of Delaware in 1941. Following graduation he joined the technical staff of DuPont's Rubber Laboratory in Deepwater Point, N. J., working in the physics and mechanical goods groups, and on wire and cable. In 1948, Mr. Keen was named division head in charge of the engineering group, and in 1953 became chief engineer of the Elastomers Laboratory at DuPont's new technical sales service center at Chestnut Run, near Wilmington. He is a member of the American Chemical Society's Division of Rubber Chemistry, and the New York and Philadelphia Rubber Groups. Mr. Keen is also a member of the Society of Automotive Engineers, and is currently serving on the advisory committee of the Rubber and Plastics Division of the American Society of Mechanical Engineers. He is active in the American Society for Testing Materials, and has made numerous contributions to the rubber industry's technical literature.

Hewitt-Robins Names Nugent

Richard F. Nugent has been appointed to the newly created position of manager of urethane foam sales and development by Hewitt-Robins, Inc., Stamford, Conn. Formerly he was manager of urethane foam sales for Curtiss-Wright Corp. Previous to that he was vice-president of sales and advertising, Ernst-Bischoff Co., Ivoryton, Conn., and director of production and purchases, Ortho-Pharmaceutical Corp., Raritan, N. J. Hewitt-Robins will produce urethane foam in a 100,000-square foot plant now being constructed in Franklin, N. J. The company is currently producing urethane foam at a temporary plant in Long Valley, N. J. When the Franklin plant is occupied, Mr. Nugent will be headquartered there. In the meantime, he will be headquartered at Long Valley.

Rubber Division Fall Meeting

The Fall Meeting of the Division of Rubber Chemistry of the American Chemical Society will be held on September 19 through 21 at Chalfonte-Haddon Hall, Atlantic City, N. J. The Rubber Division meeting will be held in conjunction with the meeting of the parent society and will feature a symposium on the literature of rubber. This symposium is being co-sponsored by the Division of Chemical Literature. The first technical session of the meeting will begin on Wednesday afternoon, September 19. This technical meeting will be preceded by a regular meeting of the 25-Year Club. The deadline for abstracts of papers to be submitted at the meeting is July 6. Abstracts should be of about 200 words and should be submitted to the secretary, Arthur M. Neal, P. O. Box 406, E. I. du Pont de Nemours, & Co., Inc., Wilmington, Del.

In an accompanying letter of transmittal, the author should tell the laboratory in which the work was done, who will deliver the paper, and how much time is required. At least one of the authors of each paper should be a member of ACS. If a paper is to be presented by authors resident in the U. S. other than graduate chemists or chemical engineers, evidence should be submitted showing that the proposed authors are ineligible for ACS membership. Four copies of the finished paper are to be in the hands of the secretary at the time of the meeting. One of the highlights of the Fall Meeting will be the presentation of the Charles Goodyear Medal with the medalist's address. Dr. S. M. Cadwell, director of research for U. S. Rubber, has been chosen this year's medalist.

Mohawk Personnel Changes

Mohawk Rubber Co., Akron, Ohio, has recently announced five personnel changes. Nyle B. Oswalt, presently in charge of the Process Development Department at Akron, has assumed his new duties as technical manager in charge of tire design, factory compounding, processing, curing and quality control at the new tire and tread rubber plant in West Helena, Ark. Replacing Mr. Oswalt at Akron will be Charles F. Harger, formerly with the B. F. Goodrich Tire & Rubber Co. as a senior product engineer. William J. Moore, previously superintendent of production at the Akron plant, has been named factory manager at the new West Helena plant. Other personnel changes include Dean Hager, technical service manager, who has been made superintendent at the Akron plant, and Gene Snow, manager of the Production Control Department, who has been appointed head of tire building and curing at the West Helena plant.

Named Sales Representative

Woburn Chemical Corp., Kearny, N. J., has announced the appointment of Ralph B. Huber, sales engineer, as New England representative. Mr. Huber will handle Woburn's complete line of fatty acids and synthetic drying oils. He has been active in the soap, textile, paint and rubber fields for more than 30 years.

Receives New Appointment

John O. Tragard

Industrial Nucleonics Corp., Columbus, Ohio, has announced the appointment of John O. Tragard to the position of industry manager for rubber and plastics. To his new position Mr. Tragard brings a wide and varied experience in industrial process instrumentation. On graduation from Harvard and Northwestern University Law School, he joined the Foxboro Co. where he served as general assistant to the vice-president and, later, as manager of sales maintenance. During World War II, Mr. Tragard was elected chairman of the Industrial Instrument Industry's National War Problems Committee. He also served as a dollar-a-year consultant to the War Production Board for four years. In 1947 he joined Fulton Sylphon as eastern division sales manager. Thereafter, he served as vice-president and general sales manager of Hammel-Dahl Co., manufacturer of automatic control valves. For many years, Mr. Tragard has been an active participant in instrument industry affairs.

Manhattan Advances Kuehn

Arthur F. Kuehn, Jr., formerly plant superintendent, has been appointed assistant resident manager of the Manhattan Rubber Manufacturing Co., Neenah, Wisc., a wholly-owned subsidiary of the Raybestos-Manhattan, Inc., Passaic, N. J. Mr. Kuehn joined the Neenah plant in 1951 and, in 1953, was appointed plant superintendent.

Purchases Cameron Machine Co.

A group headed by Wilson M. Compton, Jr., has purchased the Cameron Machine Co., Brooklyn, N. Y., manufacturers of slitting and roll-winding machinery, from Mrs. James A. Cameron, widow of the founder. Jacob Schapiro, chairman and acting president, said Mr. Compton has been appointed president. Mr. Schapiro, associated with the company more than 40 years, will continue as a director.

Hi-Sil Bulletin No. 8, published by the Columbia-Southern Chemical Corp., Pittsburgh, Penna., is on the subject "The Replacement of Natural Rubber with GR-S in Non-Black Molded Goods."

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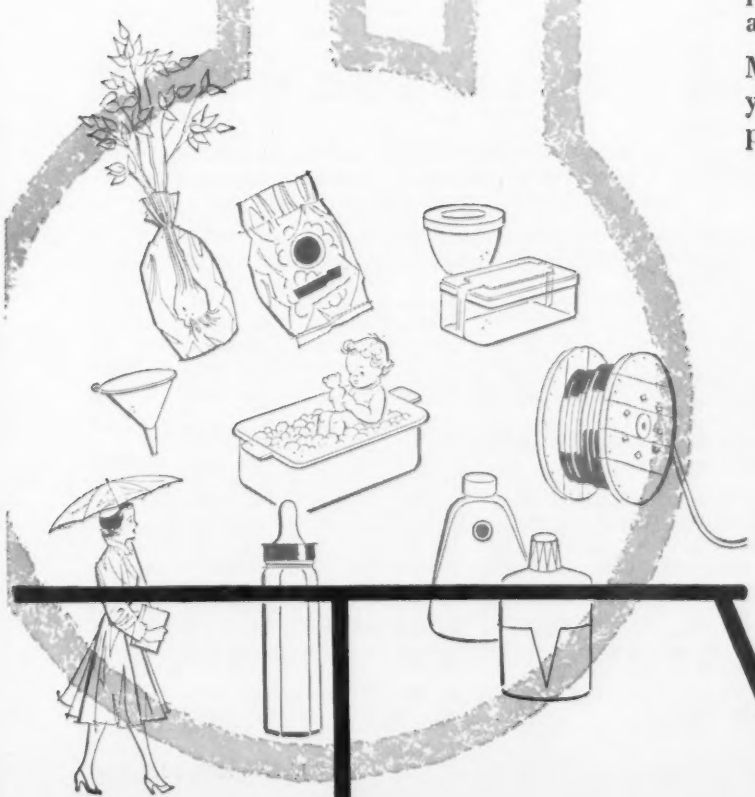

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Goodyear Captive-Air Tire

At a press conference held on June 5 in Akron, Ohio, the Goodyear Tire & Rubber Co. introduced its newest development in automobile tires, the "Captive-Air." The new casing is a dual-compartmented safety tire which—even if it is ripped open by a blowout—enables the motorist to keep driving safely at legal speeds for 100 miles or more before stopping.

It is interesting to note that this is not the first time that dual-compartmented tires have been developed by the industry. This is the first time, however, that such a tire has been introduced with separate inflation chambers. Goodyear describes the development as a new concept in tire construction—literally a tire-within-a-tire. In case of a blowout or puncture, only the air in the outer chamber escapes. The car is supported by the "captive air" in the inner tire, and it rolls on without swerving, stopping, or even slowing down.

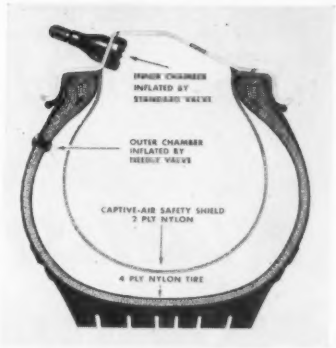
The new safety tire was inspired by Goodyear's double-air chamber "Lifeguard" which was designed to convert blowouts into slow leaks providing safety protection in the few minutes required to bring the car to a safe stop. The major difference in the new tire is that the inner chamber has no air passage connection with the outer chamber. Each is a separate air container. In case of blowout or puncture, the inner tire supports the car like a spare and keeps it rolling under complete control. It is this feature, the tire's ability to act as its own spare tire, so to speak, that makes the new development of particular interest.

Mounting, inflating and servicing the dual-chamber tire are comparatively simple steps. The motorist needs but two small simple pieces of equipment to have the tires inflated—a needle inflation tool, similar to that used to inflate a football, and an air gauge. In addition to the regular rim valve, the tire has a self-sealing valve in the sidewall of the tire, near the rim valve. First step for inserting air is to insert the inflation needle in the sidewall valve. Next, the inner chamber is inflated through the rim valve to the tire's recommended operating pressure. Then, the air hose is attached to the sidewall inflation needle and the outer chamber inflated to the same pressure as the inner chamber.

When tires are in service and the air pressure drops below the recommended level, replacement air is added only through the wheel valve to the inner chamber—adding two pounds for every pound needed, as shown by the air gauge reading. Air is equalized in the two chambers by filtering very slowly through the inner chamber. Goodyear is already in production on the four most popular sizes—6.70-15, 7.10-15, 7.60-15 and 8.00-15.

To Build Butadiene Plant

Odessa Butadiene Co., Odessa, Tex., has announced plans for the construction of a butadiene plant that will have a capacity of 50,000 tons a year. Construction is scheduled to start in midsummer and be completed a year later. The contract for the construction has been awarded to the Fluor Corp., Ltd., Los Angeles, Calif.


INNER CHAMBER INFLATED BY STANDARD VALVE
OUTER CHAMBER INFLATED BY SCHRADER VALVE
CAPTIVE-AIR SAFETY SHIELD 2 PLY NYLON
4 PLY NYLON TIRE

This cross-section of the new Goodyear Captive-Air safety tire shows the double air chamber construction and method of separately inflating inner and outer chambers.

FINANCIAL BRIEFS

Stockholders of the Armstrong Rubber Co., West Haven, Conn., have voted to increase the authorized class A shares to 6,000,000 of $1 par value from 1,500,000 of no par. The class B common also was increased to 640,000 shares of $1 par from 160,000 of no par value. Subject to favorable business conditions, the company expects to offer $7,750,000 of twenty-year, 4½% promissory notes and $9,250,000 of fifteen-year convertible subordinated debentures. The former will be sold to a group of insurance companies and the latter through public offering. Proceeds from the offering will be used to extend manufacturing facilities of the company into new geographic areas.

Thiokol Chemical Corp. has sent out rights to subscribe to 64,605 new shares ($2,002,755) of its capital stock at $31 a share. Holders of record on June 14 had until June 28 to subscribe in the share of one new share for each six held. Thiokol will use the proceeds for the construction of a plant on land being acquired in Utah.

Cooper Tire & Rubber Co. has filed a registration statement with the SEC for 97,950 shares ($1,028,745) of its no par common stock. Cooper plans to offer the shares for subscription by present holders of its common stock on the ratio of 1¼ additional shares of stock for each two held. Subscription price will be $10.50 a share. Proceeds of the issue will go for reduction of short-term bank borrowings in order to provide more working capital for expanding operations.

Cary Chemicals, Inc., plans a public offering of $2,300,000 of 6% first lien bonds, due 1976, 230,000 of 10c par common stock. The bonds and common shares will be offered in units consisting of $500 in bonds and 50 shares of stock.

Texas Butadiene and Chemical Corp. has placed $27,500,000 of first mortgage 5% notes, due 1963, privately through Carl M. Loeb, Rhoades & Co.

Kielich Named General Manager

Queen City Tulatex Corp., Burlington, Vt., manufacturers of long-fibre, resilient, rubberized cushioning for furniture, upholstery, automotive seating and packaging of instruments, has announced the appointment of E. Randolph Kielich as general manager. Mr. Kielich was formerly manager of the Foam Products Division of General Tire & Rubber Co. He is a chemical engineer and specialist in industrial organization and management, having been assigned to the Manhattan Project by the A.E.C. during World War II. Subsequently, he was in charge of production of latex foam products for the Dunlop Tire & Rubber Co., Buffalo, N. Y., and manager of the Latex Foam Products Division of the American Latex Products Corp. At General Tire, Mr. Kielich organized merchandising and distribution in furniture, bedding and automotive fields, and production and servicing of automotive units. He was in charge of research and new foam-product development departments at American Latex and at General Tire. A comprehensive program of intensive research and continuing development of new products with wide applications has been undertaken by Queen City Tulatex under Mr. Kielich's direction. Broad revisions in equipment and compounding techniques are already underway.

Welborn Named N.R.B. Director

The appointment of J. York Welborn as director of the Natural Rubber Bureau Research Laboratory has been announced by H. C. Bugbee, president, Natural Rubber Bureau. Mr. Welborn, who had been with the Bureau of Public Roads for 25 years, most recently as assistant head of the Bituminous Material Laboratory, took over his new post July 1. In his new position, Mr. Welborn will direct the rubber road research program initiated in 1949. Well known in the bituminous engineering field, he has authored and co-authored several papers on the durability of bituminous materials and recently prepared one on the use of rubber and bituminous materials. Mr. Welborn studied civil engineering at Colorado A. & M. Prior to joining the Bureau of Public Roads, he worked with the State Highway Department of Colorado and with the U. S. Geological Survey. He is a member of the American Society for Testing Materials and Asphalt Paving Technologists and has worked on numerous committees of the Highway Research Board and the American Association of State Highway Officials.

Garlock Packing Promotes Fraser

Donald F. Fraser has been appointed production manager of the Garlock Packing Co., Palmyra, N. Y., succeeding Cecil R. Hubbard who will retire August 1. Mr. Fraser has served as works manager and assistant to Mr. Hubbard since his arrival at the Palmyra plant in 1954. Prior to that he had been vice-president and general manager of Rodic Chemical & Rubber Corp., New Brunswick, N. J. Mr. Hubbard, who has been with Garlock for 33 years, will continue to serve on a consultative basis until retirement.

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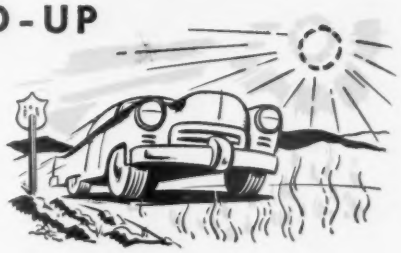

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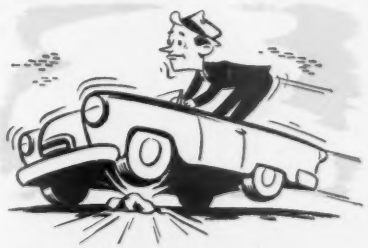

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Heads New Sales Division

Willard F. Wadt

Establishment of a new Central Sales Division, with headquarters at Chicago, Ill., has been announced by the Enjay Co., New York, N. Y. Willard F. Wadt has been named manager of the new division, which will be responsible for all of Enjay's petrochemicals sales in the central portion of the United States. Included are alcohols, chemical raw materials, solvents, Paramins, Butyl rubber and Vistanex. Mr. Wadt's new assignment is effective July 1. He joined Enjay seven months ago as assistant to the president. He is a former general superintendent of the Bayonne (N. J.) refinery of the Esso Standard Oil Co.

Enjay's new marketing setup in the area which includes the Mississippi Valley from the Great Lakes to the Gulf, and west to the Rockies, represents a further expansion of its sales effort in that part of the country. The company already has offices in Chicago and in Tulsa, Okla., and Akron, Ohio. Operations out of Tulsa as well as Chicago will be directed by the new sales division.

Mr. Wadt began his career in the petroleum and petrochemicals fields in 1933, as a test engineer at the Bayonne refinery of Esso Standard. He became general superintendent of the plant in 1953, after serving five years as assistant general superintendent. From 1946 to 1948 he was at Esso's New York headquarters as assistant to the vice-president in charge of manufacturing. Earlier, he had served as process superintendent at Bayonne. Mr. Wadt is a native of West Henrietta, N. Y. Following graduation from the University of Rochester, he obtained his master's degree in chemical engineering at the Massachusetts Institute of Technology.

New York Golf Tournament

The New York Rubber Group will hold its annual Golf Tournament on August 2 at the Innis Arden Golf Club, Old Greenwich, Conn. A full day of golfing has been arranged and luncheon and dinner will be served. Herbert J. Due (St. Joseph Lead) is chairman of the Golf Committee and Lester J. Koch (Westwood Chemical) is secretary.

West Coast News

Stillman Rubber Co., Culver City, Calif. and Cleveland, O. has made its third corporate expansion in recent weeks by acquiring Plasticast Inc., 1421 First Street, San Fernando, Calif. To be operated as the Plasticast Division of Stillman Rubber Co., the new acquisition will specialize in polyvinyl dipping and coating, slush-molding, low-pressure injection molding of plastisols, open and closed cell foam vinyl, and rotary castings. Philip Keller is general manager, George Selby is factory representative.

The company recently acquired Tele-Muff Co., manufacturer of polyvinyl specialty products, and Extruded Products Co., extruded rubber and silicone tubing firm. Both companies are operated as divisions of Stillman Rubber. Stillman Rubber produces a wide range of custom molded parts, silicone and synthetic rubber O-rings, and hydraulic packings to government and commercial specifications.

Production of C-Foam rubber will be stepped up 2,400,000 pounds annually with the completion of new plant facilities at the American Latex Products Corp., Hawthorne, Calif., according to President C. W. Christie. Increasing industrial use of foam rubber and demands of Southern California's expanding furniture and seating industry necessitated enlargement of ALPCO's plant at Hawthorne, Mr. Christie said. New machinery includes a 100-foot automatic drying line supplied by steam pressure boilers, which will improve product quality. Also added were a second complete conveyor system and additional facilities for fabrication, packaging and shipping. The plant itself was increased by an additional 24,000 square feet of roofed building to house the new equipment. The installation is the company's first step in a planned five-year expansion program designed to maintain its West Coast leadership in the field, executive vice-president T. P. Duggan stated.

Minnesota Mining & Manufacturing Co., St. Paul, Minn., has opened a new sales office and warehouse located at 6023 S. Garfield, Los Angeles. The new building contains 56,000 square feet of office and warehouse area, and will include sales and warehousing space for all of the firm's major product lines. Adhesives and coatings production and warehouse facilities will remain at the present 3M plant at 6411 Randolph, Los Angeles.

Charles Kuchar, formerly with the Master Processing Corp., Lynwood, has joined the Research Division, Aerojet Co., Azusa.

James Stull, formerly with the Mansfield Tire & Rubber Co., Oakland, has joined the Master Processing Co., Lynwood. Edward Hillendahl of the Oakland Pacific Tire Division of Mansfield was retired June 30.

Boehm Promoted by Enjay

A. Bruce Boehm

Election of A. Bruce Boehm to a newly created post as executive vice-president of the Enjay Co., Inc., New York, N. Y., has been announced by O. V. Tracy, president. Mr. Boehm has been a vice-president of Enjay and sales manager of the firm's Butyl Rubber Division. He was elected a vice-president in 1954. He began his duties as executive vice-president July 1. Rapidly expanding activities and sales in the petrochemicals field were given as major reasons for the creation of the new post. Sales of chemical products by the company rose more than 50% in 1955, compared to 1954. Mr. Boehm has been associated with the Enjay Co. since 1947, when he was appointed sales manager of its Paramins Division. He became assistant sales manager of the company in 1950. For 26 years before joining Enjay, he was with the Esso Standard Oil Co., serving in a number of marketing and sales-management posts. He began his Esso career as a lubrication engineer working out of marketing headquarters in Baltimore, Md. He is a native of Baltimore and an engineering graduate of Cornell University.

Installs New Pilot Plant

Installation of a complete pilot plant for production of polyurethane foams at the Chicago laboratories of the Emulsol Division gives the Witco Chemical Co., New York, N. Y. complete facilities for technical service on the foams, a company announcement states. Past technical service — and even research — on this new resin has been handicapped by lack of suitable equipment with which to duplicate foams made in large production units, says Dr. Charles F. Fuchs, Emulsol vice-president in charge of research. Heart of Emulsol's new installation is a specially designed proportioning-mixing machine. Witco and its divisions have no intention of starting foam production, points out Max A. Minnig, Witco president. "We are interested only in the manufacture of raw materials that will improve the qualities of polyurethane foams", he says. The company already is producing Witco 77-86, widely used as a coupler in the formation of odor-free polyurethane foams.

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Canadian News

The entire Canadian rubber industry is becoming increasingly vulnerable to foreign competition, W. H. Funston, president of the Rubber Association of Canada, stated recently. Mr. Funston is president of the Firestone Tire & Rubber Co. of Canada, Ltd. He blamed Canada's foreign trade policies for "jeopardizing" the expansion of secondary industry.

The deterioration of the Canadian industry's competitive position, Mr. Funston said, was caused by two factors. He told the association's annual meeting that one cause was the development of the rubber manufacturing industry in the low-wage countries of Europe and Asia, and another was Canada's foreign trade policy which "has consistently subordinated the interests of secondary industry to the interests of primary industry." This policy "has steadily thrown Canadian markets for manufactured goods more open to foreign competition in return for wider foreign markets for Canadian primary products."

Although footwear producers have been hardest hit by imports, he said, there is ample evidence the margin by which producers of other rubber products have been able to avoid a similar fate is narrow and becoming narrower. However, Mr. Funston said, the Canadian rubber companies expect to operate at a moderately higher level this year than last.

In other addresses, delegates to the Rubber Association of Canada meeting, were told:

Prewar, on an average, 25% in value of Canadian rubber products were exported and 5% were imported. Difference: an export balance of $13,000,000. Last year, 3% were exported and 10% imported. Difference: an import balance of $21,000,000. In the first two months of 1956, imports were worth $5,400,000, 33% up from January-February, 1955. Exports were worth $1,500,000, down 14%.

Early this year the Superior Rubber Co., and B. F. Goodrich, Canada, withdrew from the rubber footwear field, blaming the flood of imports. They pointed to the fact that exports of rubber-soled canvas shoes have dropped from 2,300,000 pairs in 1947 to 6,000 pairs last year. It is also noted that imports have risen from 2,000 pairs in 1949 to 2,500,000 pairs last year.

Imports held 1% of the Canadian market in 1949, and 56% at the end of 1955. The industry predicts that in another eight months imports will rise to 75% of the market.

In addition, the Dominion Rubber Co., one of the two major Canadian producers of bicycle tires, abandoned this market early this year. It is pointed out that imports have jumped 171% since 1950 and now account for half of the sales in Canada. Imports of other pneumatic tires have jumped from 17,000 units in 1950 to 515,000 last year.

Despite these facts, Canada's rubber industry has hit a record high in production and sales. The 84,000 long tons of new rubber processed in Canada last year was 15% up on the previous record year, 1953. Consumption of new rubber in the first two months of 1956 jumped 13% on the same period last year.

"I doubt that the industry will be able to maintain this high rate of increase throughout the year," said Mr. Funston.

Producers are now watching the fast-growing value of imports of mats and matting, gaskets, hot water bottles, weather-stripping, washers and hose.

The association's manager and secretary, Greig B. Smith, observed that world production of synthetic rubber is going up from 1,000,000 long tons last year to an estimated 1,280,000 this year. Canadian production of synthetic rubber is going up from 103,896 long tons in 1955 to an estimated 133,000 long tons this year.

The average price of natural rubber is down to 30.5c per pound compared to 39.14c last year and 23.64c in 1954, the reason being increased synthetic rubber production and decreased demand for original equipment tires in the United States.

In an election of officers, Mr. Funston was re-elected president. Other officers are: *Vice-president,* Ira G. Needles (Goodrich); *Treasurer,* J. R. Belton (Gutta Percha and Rubber); *Manager-Secretary,* Greig B. Smith. Directors of the Association include: J. P. Anderson (Dunlop), R. C. Berkinshaw (Goodyear), M. L. Brown (Seiberling), J. W. H. Miner (Miner Rubber), J. D. Morgan (Viceroy Mfg.), and C. C. Thackray (Dominion Rubber).

The Canadian Supreme Court has ruled that the Tariff Board had no right to rule that distributors of special brand tires can escape taxation as manufacturers. In a ruling for which reasons were not immediately given, the court reversed an Exchequer Court of Canada ruling upholding the Tariff Board decision.

The current tire tax decision is considered one which may have far-reaching consequences in the entire field of special brands other than tires. Tire makers plan no change immediately. Eventually, it is expected the customer may pay about 50 cents more per special brand tire. The excise tax mentioned in the ruling was dropped last year, so only the sales tax applies.

The Tariff Board ruled two years ago that such distributors of special brand tires as T. Eaton Co., Simpson-Sears and Canadian Tire Corp., cannot be classed as manufacturers for taxation purposes. Thus they could not be required to pay 10% sales and 10% excise taxes. These tolls are levied against the manufacturers, based on his selling price. In Eaton's case, they are levied against the processor, Dominion Tire Co. Special brand tires are those turned out by a processor for another company, bearing the company's brand or trade-mark and other distinctive markings.

The Court said "upon the ground that the Tariff Board had no jurisdiction to make its declaration of December 7, 1954, the appeal is allowed and the judgment of the Exchequer Court and the Tariff Board's declaration set aside." The lower court decision and that of the Tariff Board were appealed to the Supreme Court by Firestone, Goodyear, and Goodrich.

A general wage increase of eight cents an hour and inequity adjustments ranging up to 11 cents an hour were included in a new, one-year agreement between B. F. Goodrich of Canada and the United Rubber, Cork, Linoleum and Plastic Workers of America in a contract ratified recently. More than 1,000 hourly and incentive workers of the Kitchener, Ont., plant are affected.

The Seventh Canadian High Polymer Forum will be held at the Guildwood Inn, Sarnia, Ont., November 8 and 9, 1956. The Forum is co-sponsored by the National Research Council of Canada and the Chemical Institute of Canada and is devoted to all aspects of Polymer Science.

Authors of papers are requested to notify the program chairman, Dr. D. G. Ivey, Department of Physics, University of Toronto, Toronto 5, Ont., giving title and authors. Abstracts and final titles will be required by August 31, 1956. In addition to contributed papers there will be the Forum banquet, Thursday, November 8, at which Professor J. J. Hermans of the University of Leiden, will speak.

New scholarship awards totaling $8,750 have been announced by Polymer Corp., of Sarnia, Ont., to assist employee families and persons interested in a teaching career. Two of the awards, each for $1,000 a year for four years, are to be open to children of company employees entering a university in 1956. The scholarships, tenable at any recognized Canadian university, will give preference to candidates having science and mathematics options. The third award, worth $750, is open to a 1956 university graduate resident in Lambton County. Eligible applicants are expected to be prepared to teach mathematics or science in a secondary school on graduation from Ontario College of Education.

Raybestos-Manhattan (Canada) Ltd. has announced the following executive appointments: J. Stewart Munro to president of the Canadian company and Douglas Pocock to the newly-created post of vice-president, replacement sales. Mr. Munro joined Raybestos-Manhattan (Canada) Ltd. in 1941 as plant engineer and has advanced through many important positions including those as chief engineer, assistant general manager and vice-president. As president, Mr. Munro succeeds Robert Abbott who, although in retirement, will remain as a Canadian director of the company.

Mr. Pocock, one of the best known men in the automotive service field, joined Raybestos-Manhattan (Canada) Ltd. in 1920, and has held the post of sales manager since 1940. His appointment to vice-president, replacement sales, recognizes the importance of this operation and acknowledges the significant contribution Mr. Pocock has made in this field.

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Why?

Because Polysar's quality, uniformity and customer service plus the wide variety of Polysar types enable you to select the best rubber for the job.

Polysar is available in the following types:

- General Purpose
- Special Purpose
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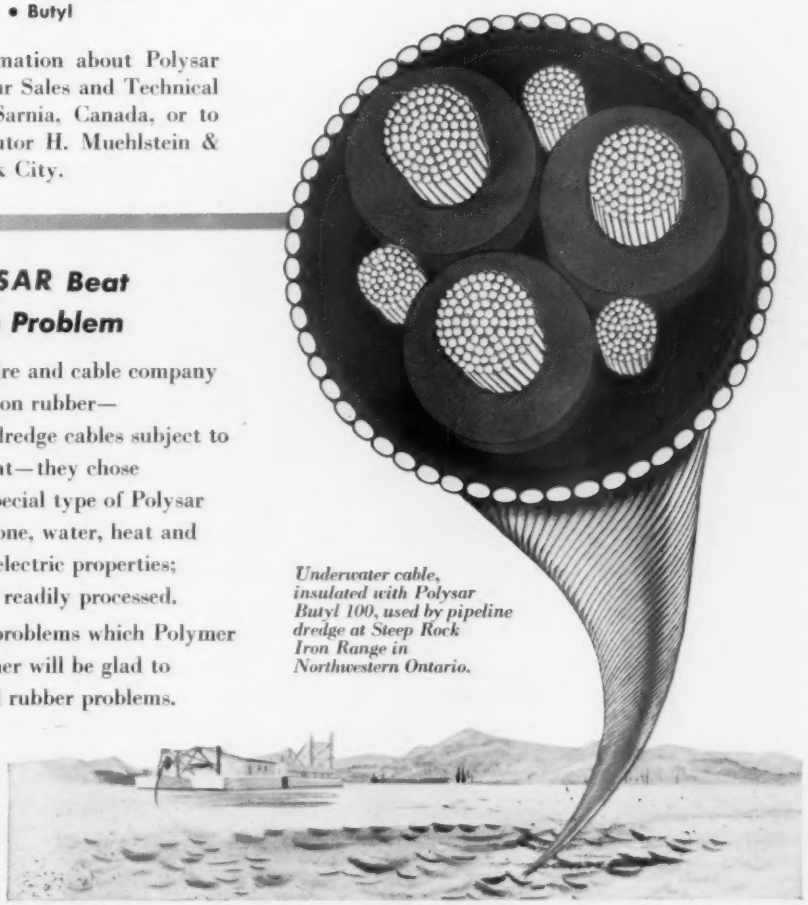
For detailed information about Polysar rubbers write to our Sales and Technical Service Division, Sarnia, Canada, or to our U.S.A. distributor H. Muehlstein & Co. Inc., New York City.

Here's How POLYSAR Beat a Critical Insulation Problem

When a large Canadian wire and cable company was looking for an insulation rubber—to be used in underwater dredge cables subject to extremely rugged treatment—they chose Polysar Butyl 100. This special type of Polysar gives high resistance to ozone, water, heat and cold; provides excellent dielectric properties; has good flexibility, and is readily processed. This is only one of many problems which Polymer has helped to solve. Polymer will be glad to help you with your critical rubber problems.



Underwater cable, insulated with Polysar Butyl 100, used by pipeline dredge at Steep Rock Iron Range in Northwestern Ontario.

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Distributors in 28 Countries Around the World

Obituaries

Robert L. Randall

Robert L. Randall, chief chemist for the Midwest Rubber Reclaiming Co., East St. Louis, Ill., died on May 28 after an extended illness. He was 45. Mr. Randall, born in St. Louis, attended Cleveland High School and was graduated from Washington University in 1933 where he studied chemical engineering. He joined Midwest

as a chemist in 1934, becoming chief chemist in 1938. Mr. Randall was a member of the American Chemical Society, having been active on committees of the local and national Society and on committees of the Rubber Reclaimers Association. He was author and co-author of numerous papers and articles related to rubber reclaiming technology and held several patents in his field. Surviving are his wife and a daughter.

Edwin P. Nicholson

Edwin P. Nicholson, sales representative of Givaudan-Delawanna, Inc., Givaudan Flavors, Inc., and Sindar Corp., in the New York-New Jersey area, died May 24 after almost five months of illness. His age was 57. Mr. Nicholson had been associated with the aromatic chemical, perfume and related industries for 36 years and last year had celebrated his 25th anniversary with the Givaudan organization. He is survived by his wife and three daughters.

Ralph F. Anschuetz

Ralph F. Anschuetz, sales representative for the Witco Chemical Co., New York, N. Y., died suddenly on May 29. During the past 17 years, Mr. Anschuetz covered Michigan, part of Chicago, Iowa and St. Louis, Mo., for Witco. He was a member of the Executive Committee of the Chicago Rubber Group and was active on their Golf Committee for many years. Mr. Anschuetz was also an experienced football official in the Big Ten Conference.

Dr. Edward B. Hunn

Dr. Edward B. Hunn, a chemist and technical adviser for the Esso Research Co., Linden, N. J., died June 6 at Rahway (N. J.) Memorial Hospital. His age was 60. Dr. Hunn received his B.S., M.S., and Ph.D. degrees from Yale University. He joined the Standard Oil Co. 34 years ago and was assigned to Esso Research and Engineering when it was founded in 1927. Three years later he was transferred to Stanco, Inc., Linden, and became assistant chief of its Technical Division, advancing in 1938 to head of the Stanco Manufacturing and Technical Department. When Stanco, Inc., was dissolved, Dr. Hunn was reassigned to Esso Research and Engineering. Dr. Hunn was the author of a number of technical articles and held several patents in the organic chemistry field. He was a member of the American Chemical Society and Sigma XI fraternity. Surviving are his wife, a son, and three daughters.

Sir Frank Beaurepaire

Sir Frank Beaurepaire, founder and later chairman of Olympic Industries, Ltd., Melbourne, Australia, died May 29 at the age of 65. Sir Frank conceived the idea of asking the International Olympic Committee to assign the 1956 games to Melbourne. He represented Australia abroad as a swimmer six times, established fourteen world records and won more than 200 championships between 1906 and 1928. He swam in the Olympics in 1908, 1924, and 1928. A member of the Melbourne City Council since 1928, Sir Frank was Lord Mayor for two terms in 1941-42. From 1942 until 1952, Sir Frank was a member of the Victorian Legislative Council, the upper house of the state legislature. He was knighted in 1942 and recently gave Melbourne University $369,600 for a school of physical education.

Isaac W. Branthwaite

Isaac W. Branthwaite, former superintendent and resident manager of the Okonite-Callender Cable Co. of Paterson, N. J., now the Okonite Co., died on May 22 at the Barnert Memorial Hospital in Paterson. His age was 72. Mr. Branthwaite retired from the concern in 1952, after 41 years of service. Surviving are his wife, two sons and a daughter.

Kenneth J. Reel

Kenneth J. Reel, a tire development engineer at the Firestone Tire & Rubber Co., Akron, Ohio, died on May 24 at his home in Akron after a year's illness. He was 55 years old. Mr. Reel was with Firestone 31 years. Born in Macedonia, Ind., he was an Akron resident 40 years. Mr. Reel is survived by his wife and three daughters.

Alexander D. King

Alexander D. King, former president of the Rubber Industry Credit Exchange, died recently at Santa Barbara, Calif. Mr. King was 69. For the last year he had served as personnel manager for a design and manufacturing concern at Goleta, Calif. A native of Kilmarnock, Scotland, he was brought to this country at age 2. Mr. King was graduated from the Moody Bible Institute in 1911. Seven years later, he finished the Chicago Law School, and in 1919, he was graduated from Northwestern University. Mr. King practiced law in Chicago from 1919 until 1932, then became executive secretary of the National Plywood and Veneer Manufacturers Association. On that job, he wrote and administered the government's National Recovery Act code for the industry. He went to Akron in 1935 as counsel for a group of rubber novelty manufacturers. When World War II broke out, he joined the Akron Presform Mold Co., Cuyahoga Falls, Ohio, as chief of personnel. Still later, he was secretary and full-time executive of the Summit County machine shop owners' organization. On leaving Akron, Mr. King resigned the presidency of the Rubber Industry Credit Exchange. Mr. King leaves his wife, two daughters and a son.

Frank D. Voorhees

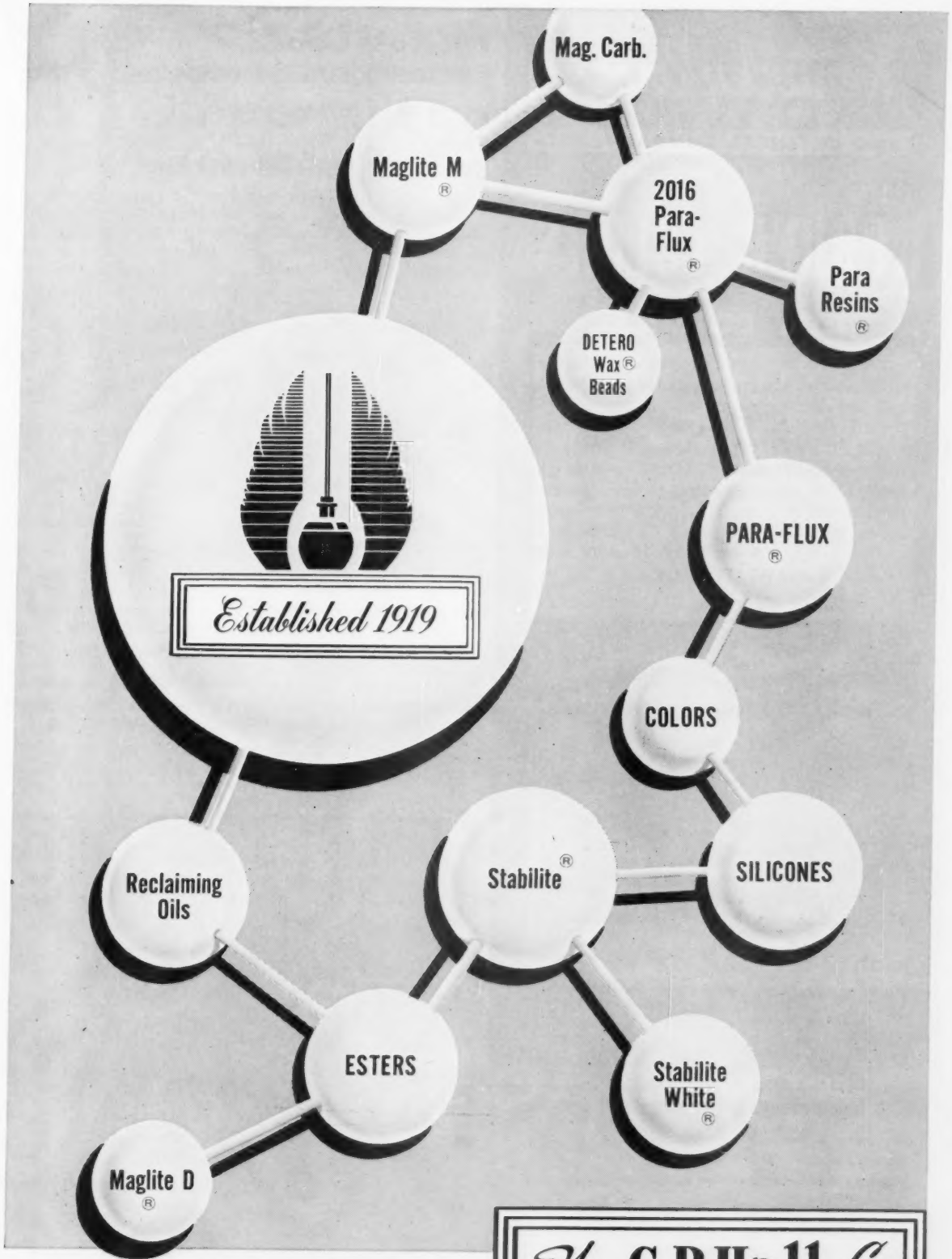
Frank D. Voorhees, former vice-president of the Voorhees Rubber Manufacturing Co., Jersey City, N. J., died May 30 in Mountainside Hospital after a long illness. He was 79. Upon his graduation from Cornell University in 1901, Mr. Voorhees joined the rubber company which had been founded by his father, John J. Voorhees. He retired 10 years ago after serving as vice-president of the firm for several years. Surviving are his wife, a son and daughter.

William A. Wright

William A. Wright, sales manager at the General Tire & Rubber Co. plant in Wabash, Ind., died June 10 after a two-year illness. His age was 51. Mr. Wright went to Wabash in 1937 from the Akron, Ohio, plant. He was active in Masonic circles and was a member of the Grotto of Akron, Commandery of Wabash and Ft. Wayne and the Scottish Rite of Ft. Wayne. He was also a member of the Elks Club. Surviving are his wife and two daughters.

Edward A. Cahill

Edward A. Cahill, assistant manager and special representative of the Central Ontario Division, Goodyear Tire & Rubber Co. Ltd., New Toronto, Canada, died recently in Toronto. His age was 66. Mr. Cahill joined the company in 1916 and had served as a salesman and manager of tire sales, Toronto branch. During World War II, he worked with the Wartime Prices and Trade Board for two years. He leaves four sons and two daughters.



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New Goods

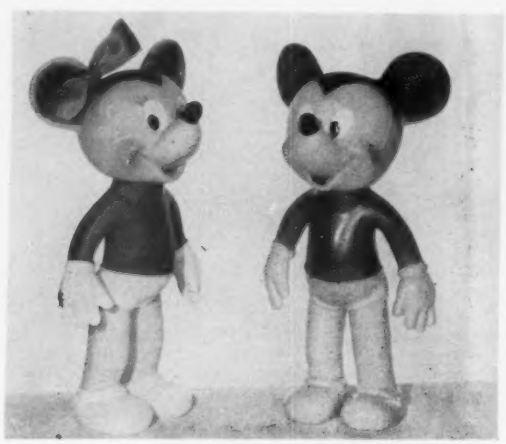
Griptite Coated Work Gloves

A new rough-finish coated fabric glove designed to provide a positive grip and to withstand oils, acids and solvents is now in production at the Surety Rubber Co., Carrollton, Ohio. The coating combines a vinyl base and Surety "Sureseal" rough finish, affording highest resistance to all chemicals as well as resistance to cutting,

snagging and abrasion. Fingers are curved for hand comfort and the Surety wing thumb construction eliminates side seams and overcomes tearing at the thumb. Sold under the trade name "Surety Griptite Coated Work Gloves," they are available with coated palm and knit wrist or fully coated with knit wrist, 12-inch gauntlet or safety cuff. Women's sizes with coated palm are furnished with knit wrist only.

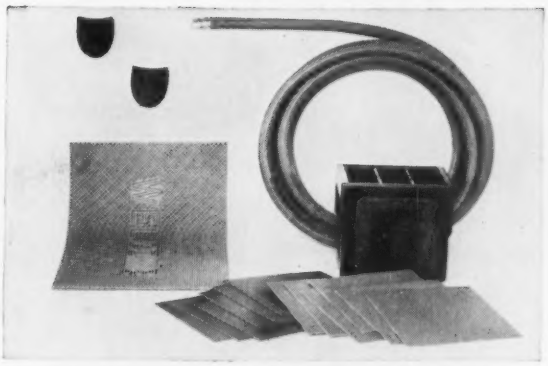
Sun Rubber Vinyl Dolls

Sun Rubber Co., Barberton, Ohio, has added three new dolls to its line of vinyl play things. Patterned after the Walt Disney characters, Minnie and Mickey Mouse



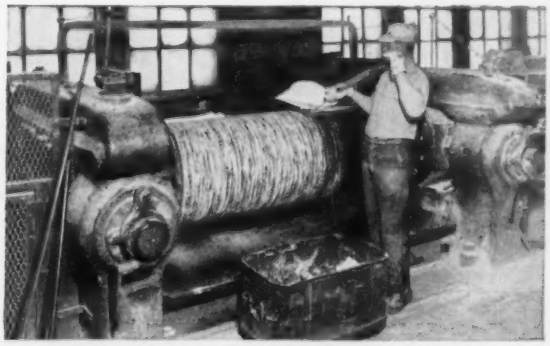
and Donald Duck, the dolls are eight inches high and feature movable heads. Minnie and Mickey are shown herewith. The dolls are colorfully decorated. All three dolls are also available in 10½-inch size.

New polymer offers rubber industry important improvements



Properties of A-C* POLYETHYLENE – Tests in laboratories and by commercial operators show that low-molecular-weight, low-viscosity A-C POLYETHYLENE has solved many problems in rubber processing. A-C POLYETHYLENE, available in pellet and powder form, is easy to handle in your plant equipment. Emulsifiable grades are also available.

Shrinkage Greatly Reduced – Addition of A-C POLYETHYLENE to milled stocks can sharply reduce shrinkage, permitting adherence to closer dimensional tolerances. In one case, shrinkage of a synthetic formulation was reduced by 75%.



Excellent Detackifying Properties – A-C POLYETHYLENE is a superior detackifying agent, especially at elevated Banbury, mill and calender temperatures of 200°F. and higher. This property is particularly valuable when compounding synthetics. It has demonstrated exceptional qualities as a mold release; as a lubricant it allows higher operational speeds.

Compatible with Natural and Synthetic Elastomers Reports from commercial users indicate that up to 25 parts of A-C POLYETHYLENE per 100 parts elastomer can be used with no indication of incompatibility. A-C POLYETHYLENE-elastomer blends have possible interest where greater resistance to oils, solvents, acids and alkalies is required. It is often reported that gloss and scuff-resistance of the product are enhanced and color and filler dispersion are accelerated. A-C POLYETHYLENE is giving the rubber industry new products and new qualities to familiar products. Try it today! Production quantities are readily available.

Information and Samples Available – Preliminary technical data is available in an eight-page brochure. Samples of A-C POLYETHYLENE are also yours for the asking.

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You be the Judge!

It's up to you to decide whether *your* rubber products will be found guilty of chemical B.O. acquired during processing. It is now possible for you to treat your batches with ALAMASK® odor-masking compounds that impart clean, neutral odors to your finished products. From the table below you can select the particular ALAMASK for your application —

"ALAMASK" TYPE RECOMMENDED	Latex					Dry Rubber				Elasto-Plastics		
	Foam	Sponge	Dipped Goods	Bonded Fibers	Adhesives	Natural	Synthetic	Reclaim	Chemically Blears	Polyvinyl	Polyaryl	Plastisols
AA										X	X	X
AF					X		X		X			
AO or AO-X					X	X	X		X			
AR or AR-F			X		X							
BF or BG-X	X	X	X		X	X	X					
BGM or BGM-X	X	X		X		X						
CY					X				X			
DJ	X	X	X				X		X			
DL							X		X			
H			X		X			X	X	X	X	
LD	X	X	X	X	X	X		X				
ND or ND-X	X	X	X	X	X	X	X	X	X	X	X	
O	X	X	X	X		X	X		X	X	X	X
OS or OS-X	X	X	X	X			X					

For use in latex, the water-dispersible "ALAMASK" form is recommended. The water-dispersible forms are designated by "-X" or "-F" following the "ALAMASK" type name.

ALAMASK has no effect on processing characteristics or rate of cure... the only noticeable effect you will detect will be the upward trend of your sales curve!

NOTE

ALAMASK also abates malodors from stack fumes and plant effluents.

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Reinforced Plastic Window

A new kind of window made of plastic reinforced glass fibers and special ingredients that filter sunlight has been developed by the Reinforced Plastic Division of the Firestone Tire & Rubber Co., Akron, Ohio. Firestone engineers claim that the molded panes permit up to 50% of visible light to pass through but keep out the ultraviolet rays. To manufacture the panes, workmen place glass fiber sheets in a mold, add a compound of polyester resin, color pigments and other ingredients, then close the mold and bake the panes. The panes have been made in many light-fast colors and measure 14 by 20 inches. Although they are a light green, there is no greenish cast to the interior of the building.

The panes are primarily for use in industrial buildings, where they replace painted glass window panes. In all installations, they protect against ultraviolet rays and still transmit soft, diffused light where needed. The panes are almost unbreakable; a hard blow with a hammer leaves only a small scar. They are easier to clean than ordinary glass and are resistant to chemicals, smoke and smog. Because color is molded into them, the panes never need painting. They are installed by the usual glazier's methods and resist vibrations and acts of vandalism.

Goodyear Vinyl Flooring

A new high fashion line of vinyl flooring, "Terra-Tone," has been announced by the Flooring Department of the Goodyear Tire & Rubber Co., Akron, Ohio. The line is a completely new vinyl flooring series, manufactured in 0.08 gauge in both 9 by 9-inch tile and 45-inch wide roll goods for light commercial and residential use. There are nine new colors in the series: pepper grey, wheat beige, mellon green, cranberry red, vanilla beige, mushroom grey, avacado green, apple green, and cinnamon brown. Retaining the built-in features of long-wear life and pre-polished surface found in other Goodyear vinyl flooring, it has a random pattern, a "carefully casual" design which is the result of the integration of color flecks within a basic color background.

Enjay Butyl—*today's fabulous rubber* gives new life to backyard wading pools

Enjay Butyl brings long life and performance strength to the sensational new Bil-O-Matic®, rubberized fabric wading pool manufactured by the Bilnor Corporation. With its resistance to aging, sunlight, tear and impact damage, the pool manufactured with Enjay Butyl gives outstanding performance. Unlike other pools that cracked and leaked after exposure to sunlight, these *new* pools retain their durability under even the toughest conditions of wear, stress, and weather. The Enjay Butyl label on the carton assures the customer of exceptional quality.

Extremely versatile, Enjay Butyl has led to improved product performance in a wide variety of fields. This amazing, low-cost rubber is *immediately available* in non-staining grades for white and light-colored applications. To find out where Enjay Butyl can *cut costs* and *improve your product*, contact the Enjay Company. Complete laboratory facilities, fully staffed by trained technicians, are at your service.

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Enjay Butyl is the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

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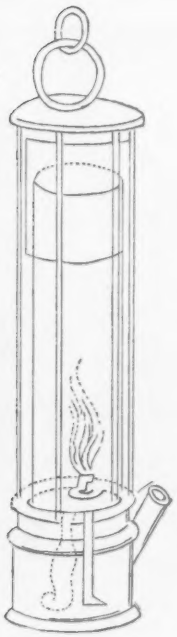

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In mining...

Sir Humphrey Davy invented the miner's safety lamp, greatly lessening hazard. Fewer mine disasters meant more coal for Britain's infant industries.

In the history of fats and waxes

Chevreul prepared stearic acid in 1816. In 1837, A. Gross & Company entered the infant fatty acid field and has since pioneered in the improvement of production techniques and products. GROCO 56 Hydrogenated Stearic Acid, for example, has been developed for incorporation into rubber compounds which require a low priced fatty acid of uniform quality.

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HYDROGENATED STEARIC ACID

Titre	55°C. min.
Titre	131°F. min.
Color 1" Lovibond Red	8 max.
Color 1" Lovibond Yellow	50 max.
Saponification Value	198 min.
Acid Value	190 min.
Iodine Value	13 max.

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Rubber Band Educational Game

A plastic pegboard and a handful of gaily colored rubber bands add up to many hours of self-expression, education and entertainment for youngsters with this new game and art form called "Rub-R-Art." Designed for ages 6 to 14, the kids "draw" their pictures with

specially designed rubber bands produced by the B. F. Goodrich Co., Akron, Ohio. The rubber bands can be stretched around more than 300 plastic pegs to form nearly any shape or design. Originated and distributed by Kleicar Corp., Chelsea, Mich., "Rub-R-Art" has received the approval of the University of Michigan Hospital School.

Roth Rubber Compound RRD-992

Roth Rubber Co., 1860 South 54 Avenue, Chicago 50, Ill., has developed a new soft, non-porous rubber, "Compound RRD-992," that can be securely bonded to metal. Development engineers at Roth believe this to be the softest, solid rubber as yet developed by the industry. The new rubber has a softness characteristic of 5 dur-

ometer and can be used in temperatures up to 200° F. It is a reasonably good electrical insulator and can be vulcanized or bonded to metal and other materials. Made in sheets or strips up to one-inch thick, the new rubber can be used to absorb vibration, dampen sound, or as an air-tight or water-tight gasket. The company will also mold or bond the rubber to metal or odd-shaped materials according to customer specification.

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- Dayton Rubber's I.T.A. plan has been in existence for 20 years. Rubber experts and teachers who give unexcelled technical assistance at a surprisingly nominal cost . . . all backed by 50 years of recognized leadership in the rubber industry . . . with 4 U. S. plants.
- We train your personnel in these modern plants . . . help you establish the latest formulae for processing natural and all new types of synthetic rubbers and textiles . . . latest "Know-How" in Tubeless Tires, Butyl Tubes, Rayon and Nylon Cords, Carbon Blacks. We also design factories and supervise machinery installations if desired. Write: International Technical Assistance Division, Dayton Rubber Co., Dayton 1, Ohio.

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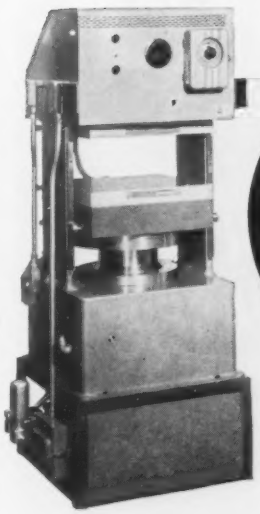
51 YEARS OF PROGRESS

The **P·H·I** *Automatic 70 Ton Hydraulic Press*



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Hydraulic System,
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with thermoswitch controls.
Two position ram gives
8"& 12" Daylight.
8" stroke with down stroke trip.

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All are high color iron oxide pigments of exceptional purity.

All are characterized by unusual brightness in mass tone and clarity in tints.

The reds in the order shown range from strong color on the light side to deeper red with bluer cast.

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Latex Wader and Wading-Totes

So-Lo Marx Rubber Co., Loveland, Ohio, has introduced a lightweight, stretchy wader, which can be folded for stowing in a tackle box, and a lightweight wading shoe that folds flat for greater carrying convenience. The new Chest Hi-"totes" are made of latex and weigh only two pounds, as compared with 10 or 12 pounds for rubberized-fabric waders. Soft and elastic, the new waders give complete freedom of movement whether the wearer sits, squats, kneels, or climbs. Because they are made in one piece, there are no seams to come apart or leak.

Suspender straps are elastic nylon, with adjustable chrome buckles, and the waders have shaped stocking feet for wear inside sneakers or wading shoes.

The new Wading Shoe-"totes" are made of the same pliable latex as the waders, but they are strengthened by neoprene-coated rubber-cord construction around the sides, toe, and heel. Non-rusting grommet screens keep sand and pebbles out while allowing free movement of water. The shoes are equipped with a thick foamed sponge inner sole for steadier footing and arch support. A textured neoprene crepe tread provides sure footing. Stretch-nylon ankle straps keep the shoes snug and prevent pulling off in mud. The Chest Hi-"totes" and Wading Shoe-"totes" are available in small, medium, and large sizes, with the latter coming also in extra large.

Embossed Wall Covering

A new decorative rubber wall covering, suitable for use in hospitals, schools, public buildings and residential dwellings where long service life and reduced maintenance are desirable, has been introduced by the R.C.A. Rubber Co., 1833 East Market Street, Akron 5, Ohio. Made of Plioflex rubber and Pliolite S-6B rubber reinforcing resin, "Embossed Wall Flex" presents a hard surface but is flexible enough to fit most contours. It is non-porous and prevents excessive dirt accumulation such as occurs in crevices of wall coverings with softer textures. Waxing is not necessary to retain rich appearance and long life.

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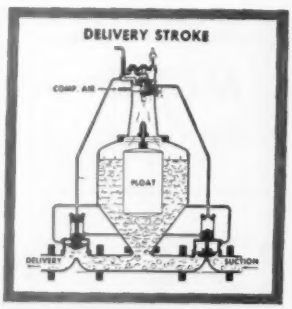

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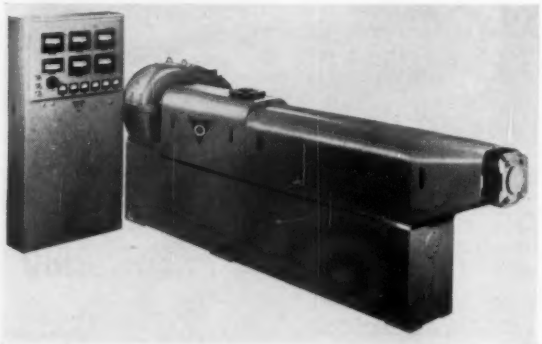
New Equipment

Prodex Direct Electrically-Heated Extruders

A new line of direct electrically-heated extruders designed for use in the rubber and plastics industries has been announced by the Prodex Corp., King George Post Road, Fords, N. J. An outstanding feature of the new machines is the fully automatic thermo control with electronic three-position temperature controllers that automatically actuate stainless steel heaters and turbo air coolers, to provide, according to the manufacturer, more precise temperature control. Utilizing triple density electrical heaters, the extruder permits heater connections



in parallel (high density), series (low density), or series parallel (medium density). This arrangement permits choice of the wattage density best suited for the projected operation.

The units also have a herringbone gear transmission and a flexible coupling between the gear transmission and thrust bearing to protect the gear transmission from mechanical shock. The output shaft is over-dimensioned and bored hollow to permit extruder screw cooling. A splash lubricating system is used. This may be optionally equipped with a water-cooling coil in the oil reservoir. The cylinder is a solid one-piece steel forging with an extra-heavy wall.

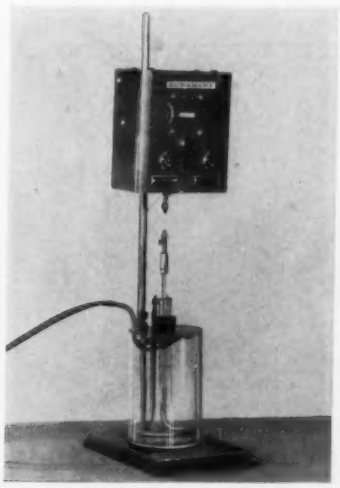
The control cabinets are completely wired with harness wiring and have terminal strip construction. They contain all temperature controllers, individual zone ammeters, contactors with pilot relays and individual fuses for each circuit. The panels are built according to J.I.C. standards. The construction is gasketed throughout and is said to be completely dustproof. All internal voltages for instrument and contactor coils are 110 volts for safe operation.

The units are equipped with swing-gates for straight heads and cross heads. A double taper clamp attaches the head and dies to the barrel and is actuated by a single screw and nut. According to the company, these features permit quick and easy clean out and screen pack changes without handling hot, heavy parts.

In addition, the extruders are cooled by turbo air blowers with adjustable air intake. These are said to provide effective and fast cooling without incurring the thermal shock and maintenance problems of liquid cooling. The equipment is available with Le/D ratios of 16:1, 20:1 and vented 24:1 in 2½, 3½, 4½, 6 and 8 inch sizes.

Sunshine Automatic Gel Time Meter

The Sunshine Scientific Instrument Co., 1810 Grant Ave., Philadelphia 15, Penna., has announced the development of a gel time meter that is said to measure automatically the time required for a fluid thermosetting composition to reach a point of rapid viscosity change during polymerization. According to the company, the



instrument is an aid in the evaluation of thermosetting compositions used in the manufacture of monomers, resins, varnishes, and other protective coatings, or for the study of such variables as reaction temperature, catalyst, inhibitor, quality, and shelf life. The device measures viscosity drag in a test sample by means of a rotating spindle suspended from a torsional spring. At the gel point, viscosity increases suddenly, and the increased drag on the spring closes a switch which sounds a buzzer, stops the timing mechanism, and gives a visible indication. A means is provided to control the temperature of the bath surrounding the sample. Gel time is read to the nearest 0.1 minute on the dials of a 10,000 minute reset counter on the front of the control unit. The company states that the unit's operating sequence allows accurate repeatability.

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- **For GR-S Compounding** "Iceberg" is useful in compounds requiring good white filler with good processing properties.

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- **For Vinyl Insulating and Electrical Compounds** No. 30 possesses excellent color and yields high insulation resistance values.
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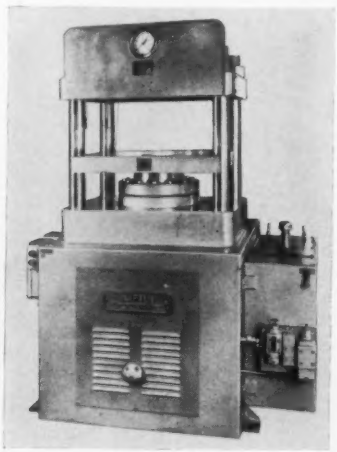
Clifton Self-Contained Hydraulic Press

Designed particularly to meet the problem of heavy production schedule requirements, the Clifton Hydraulic Press Co., 288 Allwood Road, Clifton, N. J., has announced the production of a new, self-contained hydraulic press. Called the Model 3A, it utilizes a power return and such rugged construction features as a heavy duty platen and platen guide assembly, automotive type piston



rings on the ram head, and special packings. The press, available in capacities of 50, ,100, 150 and 300 tons, is equipped with a Unitrol unit, a special single control unit developed by the company to eliminate piping and plumbing and provide single control for operation. The unit completely controls the hydraulic circuit. Valves, therefore, are easily accessible for repairs. Lines that might burst under overload pressure are eliminated by being self-contained (drilled into the unit). Optional equipment available would include either steam-cored or electrically-heated platens and a semi-automatic unit for presetting time cycles.

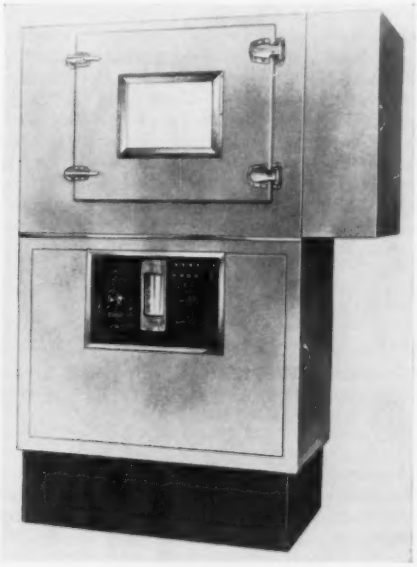
Allis-Chalmers Synduction Motor

A new synchronous motor, called the Synduction Motor, has been announced by the Allis-Chalmers Manufacturing Co., Milwaukee 1, Wisc. The motor is available in ratings from ¼ to 40 horsepower. It is built on standard induction motor frames and enclosures, and uses a die-cast rotor. The motor is said to require no brushes, slip rings or windings on the rotor, separate source of direct current excitation, or special starting equipment as is the case with standard synchronous motors. According to the company, the new machine offers several advantages over existing types of synchronous reluctance motors, and approaches the efficiency and power factor of squirrel-cage units. It starts as an induction motor with a very high locked-rotor torque, accelerates and pulls into synchronism quickly, and runs as a synchronous motor. Having a high (175 to 200%) pull-out torque, the motor remains in synchronism regardless of load or line voltage fluctuations. The new motor has been designed to operate over a wide frequency, and therefore, a wide speed range. Frequencies of 300 cycles and speed above 10,000 rpm are available.

Mast Model 700-1 Ozone Test Chamber

Mast Development Co., Inc., 2212 East 12th St., Davenport, Iowa, has announced the introduction of a new laboratory chamber for testing the ozone resistance of rubber and other organic materials in accordance with present and projected SAE-ASTM standards.

Called the Model 700-1 Ozone Test Chamber, it is said that ozone concentration to 750 parts per hundred million can be maintained in it. Freshly ozonized air may



be introduced at flow rates up to eight cubic feet per minute. Air recirculates over the samples at a rate of two feet per second. Temperature control is afforded over a range from —5° ambient to 150° F. ±1° F. Absorption and titration apparatus and flaskware, in an integral compartment, are designed to be used by non-specialized laboratory personnel, according to the company. The unit is 76 inches high, 54 inches wide, and 28 inches deep. The interior chamber is constructed of stainless steel, and the exterior is gray Hammerloid enamel trimmed with chrome.

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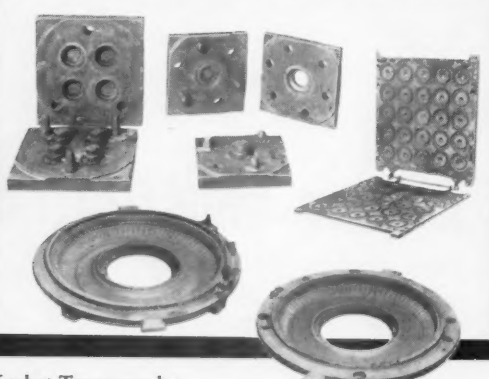

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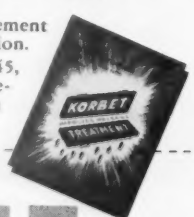

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Reviews

BOOKS

Rubber in Automobile Engineering. By R. Dean-Averns. Published by the Natural Rubber Development Board, London, England. Available in the U. S. from the Natural Rubber Bureau, 1631 K St., N.W., Washington 6, D. C. 5¾ x 8¾ in. 216 pp. 75c.

This new book by the noted British automotive engineer R. Deans-Averns is one of the most comprehensive gathering of material on the subject ever published. The author compiles in one volume a cross-section of detailed information that has work-a-day value for every automotive engineer. Over 100 illustrations and diagrams supplement the text. The book, which is a survey of the numerous uses of rubber in the automobile with special emphasis on design considerations, gives a complete summary of the uses of rubber in the automobile industry, from the theoretical principles of construction to examples of their application in many different makes of vehicles. The author covers such aspects of the use of rubber in the automobile as: engine vibration problems; suspension systems; the pneumatic tire; rubber in units attached to the body or frame; rubber in electrical fittings, hose, seals, etc.; rubber in body building and mounting; rubber in door mounting, glazing, panels, flooring and seating.

•

Polyurethanes: A Versatile Synthetic for a Dynamic Era. Polyurethane Associates, P.O. Box 98, Cambridge 38, Mass. 8½ x 11 in. 128 pp. $10.00.

Written as a group project by nine second year students at the Harvard Graduate School of Business Administration, this illustrated report is an analysis of the various aspects of polyurethanes, including technical, production, and marketing information. An effort was made by the authors to review developments to date, and to project original estimates for capitalization necessary to enter particular phases of the industry. The first section reviews the technical progress which has been made in connection with both the polyester and polyether resin foams and reports on the physical and chemical properties of all polyurethane materials. The second section develops the profit and loss and balance sheet aspects of urethane foam manufacture. The third section is devoted to discussions of the market applications of polyurethanes in all its forms, as a foam, rubber, adhesive and coating. The study should be of interest to companies in the field or in competitive and related industries, and to potential investors in it.

•

Legal Problems in Engineering. By Melvin Nord. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9¼ in. 412 pp. $7.50.

Written by an engineer who is also a practicing lawyer, this book is designed for use and reference by all engineers. It is intended to help the engineer avoid legal problems before they arise and to work more effectively with lawyers if legal problems do arise. The book deals with almost every legal subject that has any bearing on engineering, and its treatment of each topic is deep and thorough. This breadth and depth is possible because of a number of space-saving features such as the elimination of detailed documentary examples, like specifications, which are readily available elsewhere. Savings in space have also been possible because the book does not attempt to combine law and economics, however, wherever economic topics affect the law or its engineering aspects, they are fully developed. The book treats of case material instead of following the usual "casebook" approach. Cases are used to illustrate the discussion and to point up the legal problems that may be encountered in given circumstances.

BOOKLETS, CATALOGS, etc.

Keeping Pace with Automation: Practical Guides for the Company Executive. (Special Report No. 7). Published by the American Management Association, 1515 Broadway, New York 36, N. Y. 6 x 9 in. 140 pp. $3.75.

According to a company president writing in this new book, automation "will arrive just in time to give us a fighting chance to keep up with the growing dynamism of our society." From general considerations like this to the specifics of company experience, this book surveys the many aspects of automatic processing in today's factory and looks at the possible effects of automation on tomorrow's processes, managers, and workers. On the basis of the experience of companies that have successfully automated manufacturing processes already, this report suggests answers to such questions as: Will centralized control be possible? How automatic can we get? What is the impact of automation on the average worker? The book also includes a section on basic theory, which gives executives a good background in automation techniques and methods, automatic controls for the job shop, and similar subjects.

•

How to Install and Take Care of Steam Pumps. Worthington Corp., Harrison, N. J. 8½ x 11 in. 23 pp.

In this bulletin, a step-by-step series of 88 illustrations and appropriate captions presents information on increased service life for all types of steam pumps. Specifically designed to aid operators and maintenance men in adding years of reliable service to steam pumps, 28 tips on proper installation and 54 tips on field-proven care techniques are offered. The bulletin is divided into two parts: Part 1 describes suction, installing the pump, packing, starting the pump and trouble shooting. Part 2 is devoted to maintenance and covers setting and adjusting of steam valves, removing the liquid piston and rod, installing piston packing, removing and installing liners, removing and replacing valves and servicing them, and replacing the gaskets.

•

Manual and Automatic Valves for the Tough Jobs. P-K Industries, 27 Porete Avenue, North Arlington, N. J. 8½ x 11 in. 22 pp.

This catalog illustrates a line of valves specifically designed for the problems that increasing pressures and temperatures are creating in the industrial process and power industries. Descriptions of the design theory, operating principal and mechanical operation of the P-K Paul line of valves are presented and valve performance and engineering data are given. Material specifications—valve sizes, pressure and temperature ranges—are listed in chart form. The valves described and illustrated include automatic and manual control valves, bellows seal valves, special design control valves, high pressure valves, blowdown and blow-off valves, and industrial hose valves.

•

Guide for Purchasing Complex and Unusual Alloy Sheet and Light Plate Fabrication. S. Blickman, Inc., Weehawken, N. J. 8½ x 11 in. 32 pp.

This booklet describes how special fabrication skills developed by the company solves problems involving intricate shapes, close tolerances, special welding techniques, high finishes and mechanical components. Alloys described in the booklet, which are used in these fabrications, include stainless steel, aluminum, monel, inconel, nickel, titanium, multimet, hastelloy and other metals in gauges up to ⅜ inches. Fabrication sizes vary from small assemblies to dimensions of 30 feet long or more. Numerous illustrations show a wide variety of company fabricated products which find use in many different industries.

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A constant volume of air at a controlled temperature in the heavily insulated cabinet, maintains uniform predetermined specimen temperatures regardless of variations in room conditions.

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Source of radiation is two Atlas enclosed violet carbon arcs.

Complete technical information on the DMC Model and other Weather-Ometers is contained in the new Weather-Ometer catalog. Copy on request.

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The Atlas Fade-Ometer has world-wide acceptance as the standard machine for testing the action of sunlight on materials.

A wide range of industrial products are tested daily in Atlas Fade-Ometers to determine the deterioration of materials due to the action of sunlight.

From 21 to 126 samples, depending on size, can be simultaneously exposed to the light of the Atlas Enclosed Carbon Arc. Temperature is controlled automatically and humidity is furnished by evaporation from a constant water reservoir. Operation of the Fade-Ometer is completely automatic, permitting the machine to be left in continuous 24-hour operation.

The Carbon Arc Lamp in the Fade-Ometer is the closest known duplicate of sunlight, both as to intensity and spectral distribution.

If your product is subject to deterioration by sunlight our engineers, with over a quarter of a century of experience in predetermining the fading of materials, can help you.

Catalog with technical information on request

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REVIEWS (CONT'D)

Color Comes of Age. Organic Chemicals Division, American Cyanamid Co., Bound Brook, N. J. 12 x 9 in. 12 pp.

This booklet is a reprint of a story on color and its applications in industry published in the February, 1956, issue of *Industrial Design* magazine. The article explains not only what color is and how new colors are discovered, but it suggests how color can be applied to different materials with a view toward design, engineering and marketing. It also deals with color as an aspect of industrial technology and is written from a technological point of view with an interest in the problems of application. Dealing with major groups of materials to which color is being applied today, the article, through specific case studies, shows what has been done, what is being done, and what might be expected in the ever-widening application of color.

•

Room Temperature Bonding. By Jerome L. Been. Rubber & Asbestos Corp., 225 Belleville Avenue, Bloomfield, N. J. 8½ x 11 in. 8 pp.

This profusely illustrated booklet describes application techniques, precautions, advantages and limitations of adhesive bonding at room temperatures. Particular emphasis is placed on the new epoxy-based adhesives which need neither heat cure nor pressure and which are reported to offer new, high strength fastening possibilities for plastics, metals and other components. Included in the booklet are tables, charts, photos and data on how to attain longest pot life from two-part formulations; information as to how to speed cures with moderate applications of heat; data on "strength vs. temperature" for epoxy adhesives, and "cost of heat resistance."

•

Radioactive Chemicals and Technical Services. Tracerlab, Inc., 130 High St., Boston 10, Mass. 7 x 10 in. 32 pp.

This catalog on radioactive chemicals and technical services offered by the company is probably the most comprehensive ever compiled in the nuclear field. The many services, chemical and radioactive sources available from the company's three laboratories are summarized in detail. The isotopically labeled compounds and the radioactive sources are listed. In addition, there are several useful tables covering beta emitters, hard gamma emitters and available radioisotopes listed according to half-life. Certainly, this catalog will find use for all those interested in the general field of nucleonics.

•

Survey: Properties, Uses, Potentials of Cachalot Fatty Alcohols. M. Michel & Co., 90 Broad St., New York 4, N. Y. 11 x 8½ in. 12 pp.

Included in this booklet are data on the company's line of straight-chain aliphatic alcohols. It includes over 100 uses for Cachalot C12 to C18 higher alcohols as intermediates and additives in the chemical processing industries. Typical reactions of saturated and unsaturated alcohols are given as well as solubilities of primary alcohols in 12 solvents. In addition, infra-red spectra data is given for lauryl, cetyl, stearyl, and oleyl alcohols.

•

Speed King Pilot Operated Control Valves. (Bulletin SK 356). Valvair Corp., 454 Morgan Ave., Akron 11, Ohio. 8½ x 11 in. 6 pp.

Printed in three colors, this bulletin describes in detail the operation, uses and optional features of the company's single and double solenoid valves. It is illustrated with over two dozen half tone cuts and line drawings showing the valves in various stages of operation. It also includes tables which cover types of service, pressure ranges, condensed specifications and dimensions.

How to Hedge Commodities. Merrill Lynch, Pierce, Fenner & Beane, 70 Pine St., New York 5, N. Y. 5¼ x 8 in. 68 pp.

Divided into two sections, this booklet is designed to give the reader some practical information for formulating a hedging program in commodities trading. The first section gives a basic explanation of the future hedge transaction with specific examples of a selling hedge, a buying hedge, and a hedgers operation. The second section deals with the practical application of the fundamental hedging principles. Examples are detailed but the technical terms are kept to a minimum. Such subjects as call transactions, transfer transactions, squeezes, premiums and discounts are treated in the second section.

•

Central Hydraulic Systems. (Bulletin 900). Greer Hydraulics, Inc. N. Y. International Airport, Jamaica 30, N. Y. 8½ x 11 in. 8 pp.

Newly revised for the benefit of the rubber and plastics industries, this bulletin illustrates how Greer Hydropneumatic accumulators can substantially reduce the size, complexity and operating costs of hydraulic molding equipment. Data pertaining to compression molding press systems, particularly the weight-loaded accumulator system and hydropneumatic accumulator systems, are included. Line drawings simplify the description for installations on presses used in molding rubber and plastic materials.

•

Seiberling Product and Data Book. Seiberling Rubber Co., Akron 9, Ohio. 5 x 7 in. 88 pp.

Designed for use by sales representatives of the Seiberling Rubber Co. and its independent distributors, this handsome, spiral-bound data booklet gives specifications on Seiberling truck and special purpose tires. It also describes the individual tires making up the company's passenger car line. Of special interest are the technical sections on truck overloading, speed and load ratios, load distribution, rims, tire mounting, tire care and balancing. The booklet is liberally illustrated with photographs and line drawings.

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Fatty Acids: Specifications, Components. A. Gross & Co., 295 Madison Ave., New York 17, N. Y. 8½ x 11 in. 4 pp.

This four-page brochure tabulates the specifications and components of Groco fatty acids. The brochure is so designed as to permit the reader to see at a glance all vital data on the company's line of stearic, oleic, tallow and vegetable fatty acids. The results of such tests as saponification value, acid value, iodine value (WIJS), and refractive index are given.

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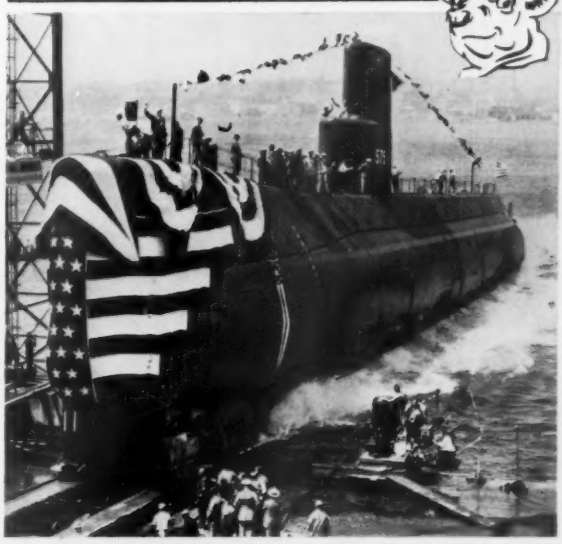
FOR PRECISION
McNEIL
AKRON
Manufacturers of the World's
Finest Rubber Curing Equipment

Another coating problem solved by Borden . . .



how a Borden chemical helped "launch" the atomic Seawolf

THE instant the Seawolf started her initial dive under the sea, a Borden chemical started protecting the Navy's mighty guardian of our shores from a constant enemy—corrosion in vital ballast tanks.

Here's the inside story: A submarine must flood sea water into her ballast tanks to dive . . . then blow it out in order to surface. Therefore, these tanks must be lined with a dependable coating resistant to the corrosive attack of sea water. To assure this vital protection, Borden's Resinous-Reslac Department furnished a coating that has been used for years in submarines . . . and has proved its superiority beyond question.

This submarine "protector" is but another example of Borden's creative chemistry at work in the coating field. If you have a product that may be developed or improved through use of the right resin emulsion, solution, or hot melt for adhesive bases, binders, coatings, sizes and saturants, take advantage of Borden's experience. *If time is of the essence . . . phone us and we'll have a technical representative at your plant within 48 hours.* The Borden Company, Resinous-Reslac Dept. CW-76, 103 Foster St., Peabody, Mass. In Chicago: Resinous-Reslac Dept., 3634 W. 38th St., Chicago 32, Ill. In Canada: American Resinous Chemicals of Canada Ltd., 20 Trent St., Toronto, Canada.

RESINOUS-RESLAC DEPARTMENT

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THE Borden COMPANY
CHEMICAL DIVISION

MARKET REPORTS

TRENDS
NEWS
PRICES

NEW YORK, JUNE 29, 1956

Natural Rubber

Since our last report (June 1), the price of spot rubber on the New York Commodity Exchange has moved in a range of 725 points, high for the period being 33.75c reached on June 25 and again on June 26, and low being 26.50c reached on June 1. The average price of spot rubber for the month of June was 30.54c based on 21 trading days. This compares with an average of 29.61c in the previous month.

In spite of the present steel strike, continued consumer apathy and the recent sharp advance in the rubber price structure, the tone of the market, both in the United States and abroad, is characterized as steady by the trade.

There is reported to be very little factory business and the feeling is widespread that manufacturers are "wide open" on requirements beyond the summer. The trade impression prevails that considerable factory buying will have to get underway in the very near future to take care of the needs of the season of high consumption which begins in mid-September.

No Stockpile Changes

The Office of Defense Mobilization has announced that "no change is being made at this time in either the stockpile objective for natural rubber or in the program for rotating rubber already in the strategic stockpile inventory." The ODM announcement goes on to say: "Like all other materials in the stockpile the rubber objective is under continuing study and when new military mobilization requirements for rubber products are received in the latter part of 1956 a new review will be undertaken."

ODM officials stated that purchase operations for additional rubber had been terminated almost three years ago when the stockpile objective virtually had been reached. Since then, purchases have been limited to amounts required to rotate rubber already in the stockpile.

Russian Aid for Indonesia?

Indonesia reportedly has agreed to accept technological aid from Russia similar to that received from the United States. A Soviet mission is expected to conclude a trade agreement under which Indonesia will receive farm machinery in exchange for rubber and other materials. It is also said that Indonesia will now review its trade agreements with countries in the Soviet orbit for possible improvement.

Meanwhile, the "go-slow" on Malayan rubber estates cut May production in the Federation by 10.6% to 43,092 tons. It was the lowest production since April, 1954, but had no particular effect on the market which, in some cases, was expecting crops of as much as 10,000 tons, instead of the actual 5,146 tons. Estate production fell by 12% to 23,389 tons and smallholders' output by 9% to 19,703 tons. The drop in smallholders' production was unexpected, but probably was due to a drop in price late in May.

The yield from the rubber export duty in the Federation continued to drop. The yield in May was $7,300,000 (Malayan) against $11,100,000 in April.

Price Data

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM JUNE 1 TO JUNE 29

June	Spot	July	Sept.	Dec.	Sales
1	26.50	26.15	25.45	24.80	115
2	....	....	....	....	...
3	....	....	....	....	...
4	27.25	26.90	26.15	25.45	198
5	27.00	26.70	25.85	25.25	86
6	28.00	27.70	26.60	25.85	238
7	30.00	29.90	27.50	26.65	209
8	30.50	30.10	27.65	26.80	272
9	....	....	....	....	...
10	....	....	....	....	...
11	29.50	29.05	26.68	25.73	166
12	30.75	30.50	27.75	26.60	242
13	30.25	29.75	27.50	26.25	323
14	30.75	29.90	27.90	26.95	198
15	30.50	30.35	28.20	27.05	190
16	....	....	....	....	...
17	....	....	....	....	...
18	31.50	31.15	29.55	28.35	246
19	30.50	29.90	28.65	27.50	144
20	30.50	29.95	28.65	27.30	99
21	31.00	30.75	29.45	28.05	121
22	31.00	30.65	29.20	27.85	113
23	....	....	....	....	...
24	....	....	....	....	...
25	31.75	32.00	30.85	29.32	278
26	33.75	33.65	31.85	29.80	424
27	33.75	33.50	32.15	30.15	205
28	33.50	33.05	31.60	29.65	99
29	33.00	33.00	30.95	29.25	183

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.33
July	.32½
August	.31¾
Thin Latex Crepe:	
Spot	.38½
Thin Brown Crepe, No. 2	.26¾
Flat Bark Crepe	.19½

London Market
(Standard Smoked Sheets)

Sept.	29.43 - 29.58
Oct.-Dec.	28.85 - 29.00

Singapore Market
(Standard Smoked Sheets)

Aug.	29.40 - 29.48

Middling Upland Quotations

	May 31	June 29		
	Close	High	Low	Close
July	34.59	34.60	34.52	34.55
Oct.	32.50	32.69	32.63	32.68
Dec.	32.60	32.75	32.70	32.74

Notes and Quotes

Leonard K. Firestone, president of the Firestone Tire & Rubber Co. of California, in a recent address stated that "big business" is essential to the United States in peace and war. He made the observation while talking about the growth factor in industry as a fundamental of the American system of free enterprise. He predicted that big business would continue to grow, but not disproportionally. "Obviously", he stated, "companies will continue to grow in size as the country grows. This will be accompanied by an increase in the number of manufacturing enterprises. These two trends will not, however, be accompanied by increased concentration of manufacturing. In other words, while the average company will grow as the country grows, I do not think it will grow any faster, or in particular that larger companies will achieve a disproportionate growth."

Synthetic Rubber

According to the U.S. Tariff Commission, production of all types of synthetic rubbers last year reached a record 2,261,000 pounds, up 58% from 1954 and 13% from the peak year 1951. The Tariff Commission also reported a strong gain in the production of rubber-processing chemicals, 177,000,000 pounds in 1955, an increase of 36% over 1954.

Sales of all types of synthetic elastomers in 1955 soared to 2,240,000 pounds, compared with 1,497,000 pounds in 1954. The sales were valued at $661,000,000. The output of cyclic elastomers in 1955 was set at 1,693,000 pounds, 74% higher than in the previous year. Sales of this type of elastomer were 1,691,000 pounds valued at $418,000,000, compared with 1,029,000 pounds valued at $242,000,000 in 1954.

Acyclic Elastomer Production

Production of acyclic elastomers, including neoprene, Butyl, silicone, isobutylene, vinyl and others, totaled 568,000,000 pounds, or 23% more than the 462,000,000 pounds reported for 1954. Sales were set at 549,000,000 pounds valued at $243,000,000.

Sales of rubber-processing chemicals in 1955 totaled 143,000,000 pounds valued at $86,000,000. This compares with 101,000,000 pounds valued at $62,000,000 in 1954. Output of cyclic rubber-processing chemicals in 1955 ran well ahead of 1954, reaching 148,000,000 pounds contrasted with 110,000,000 in 1954. Sales of these chemicals in 1955 totaled 121,000,000 pounds valued at $70,000,000. Sales of acyclic chemicals in 1955 totaled 22,000,000 pounds valued at $15,000,000 compared with 16,000,000 pounds valued at $12,000,000 in 1954.

RMA Production Reports

The Rubber Manufacturers Association reports that in the first five months of this year, a total of 463,914 long tons of synthetic rubber were produced in the U.S. and 3,769 long tons imported. Subtracting the 61,198 long tons which were exported during the period, we find a net new synthetic rubber supply of 406,485 long tons in the first five months of the current year.

According to RMA, 379,860 long tons of all types of synthetic rubber were consumed in the first five months of 1956, and at the conclusion of the period there were 160,446 long tons in stocks on hand.

The RMA figures indicate that there were 377,424 long tons of S-type rubbers produced and 2,924 long tons imported. During the first five months of this year, 45,677 long tons were exported, leaving a net new supply of S-type of 334,671 long tons. Consumption during the period was set at 315,720 long tons of S-type with stocks at the end of the period totaling 126,034 long tons.

It is also estimated that through May of this year there were 32,257 long tons of neoprene, 25,399 of Butyl rubber, and 14,158 long tons of N-types in net new supply. A total of 31,921 long tons of neoprene, 21,331 long tons of Butyl, and 10,888 long tons of N-type were consumed during the period.

Minimum Heat Distortion...
Better Dimensional Stability...
with

POLYPOL S-70

Hot pavements are hard on rubber soles compounded with thermoplastic resins. After a while the rubber tends to thin out at the center and roll up at the edges.

When POLYPOL S-70 replaces these resins in soling – or in other semi-hard items subject to distorting heat – the problem is reduced to a minimum. Costs go down too.

POLYPOL S-70 is a coprecipitate of nonthermoplastic INDULIN, an alkali lignin, and a butadiene-styrene copolymer. Send for samples and bulletins of the 200 series.

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MILWAUKEE—SHERIDAN 4-7020

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Easy release from pressure sensitive and tacky surfaces

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Features of the new Patapars include: *dense, fibre free texture, high resistance to penetration or migration of oil and softeners, permanent releasing action.*

Ideal backing for pressure sensitive surfaces

Separator for rubber tape — just the right releasing action.

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Tell us the application you have in mind and we will send testing samples and technical data.

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Vegetable Parchment
HI-WET-STRENGTH · GREASE-RESISTING

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Bristol, Pennsylvania
Sales Offices: New York, Chicago
West Coast Plant:
Sunnyvale, California

HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885

PRICES OF COMMERCIALLY AVAILABLE SYNTHETIC RUBBER POLYMERS

(dry types—per pound carload unless otherwise specified)

Butadiene-Acrylonitrile Types

Butaprene NAA	.5400 [1]
Butaprene NF	.4900 [1]
Butaprene NL	.5000 [1]
Butaprene NXM	.5800 [1]
Chemigum N1	.6400 [2]
Chemigum N3	.5800 [2]
Chemigum N5	.5800 [2]
Chemigum N6	.5000 [2]
Chemigum N7	.5000 [2]
Hycar 1001	.5800 [2]
Hycar 1002	.5000 [2]
Hycar 1014	.6000 [2]
Hycar 1041	.5800 [2]
Hycar 1042	.5000 [2]
Hycar 1043	.5000 [2]
Hycar 1312	.6000 [2]
Hycar 1411	.6200 [2]
Hycar 1432	.5900 [2]
Hycar 1441	.6200 [2]
Paracril B	.5000 [2]
Paracril BJ	.5000 [2]
Paracril C	.5800 [2]
Polysar Krynac 800	.5000 [2]
Polysar Krynac 801	.5800 [2]
Polysar Krynac 802	.5000 [2]
Polysar Krynac 803	.5000 [2]
Naugapol 1018	.2700 [2]

Butadiene-Styrene Types

Ameripol 1001	.2410 [2]
Ameripol 1002	.2435 [2]
Ameripol 1006	.2410 [2]
Ameripol 1500	.2410 [2]
Ameripol 1501	.2410 [2]
Ameripol 1502	.2410 [2]
Ameripol 1703	.2060 [2]
Ameripol 1705	.2035 [2]
Ameripol 1706	.2035 [2]
Ameripol 1707	.1910 [2]
Ameripol 1709	.1885 [2]
Ameripol 1710	.1885 [2]
Ameripol 1711	.1885 [2]
Ameripol 1712	.1885 [2]
ASRC 1500	.2410 [2]
ASRC 1502	.2410 [2]
Baytown 1600	.1850 [2]
Baytown 1601	.1850 [2]
Baytown 1602	.1850 [2]
Baytown 1801	.1700 [2]
Copo 1500	.2410 [2]
Copo 1502	.2410 [2]
Copo 1712	.1885 [2]
FR-S 1000	.2300 [2]
FR-S 1001	.2300 [2]
FR-S 1004	.2300 [2]
FR-S 1006	.2300 [2]
FR-S 1009	.2600 [2]
FR-S 1010	.2650 [2]
FR-S 1012	.2700 [2]
FR-S 1013	.2600 [2]
FR-S 1015	.2800 [2]
FR-S 1500	.2300 [2]
FR-S 1502	.2300 [2]
FR-S 1703	.1950 [2]
FR-S 1705	.1925 [2]
FR-S 1710	.1775 [2]

Butadiene-Styrene (Cont'd)

Naugapol 1016	.2650 [2]
Naugapol 1018	.2700 [2]
Naugapol 1019	.2650 [2]
Naugapol 1021	.3000 [2]
Naugapol 1022	.2800 [2]
Naugapol 1023	.2850 [2]
Naugapol 1503	.2700 [2]
Naugapol 1504	.2950 [2]
Philprene 1000	.2410 [1]
Philprene 1001	.2410 [1]
Philprene 1006	.2410 [1]
Philprene 1009	.2550 [1]
Philprene 1018	.2700 [1]
Philprene 1019	.2650 [1]
Philprene 1500	.2410 [1]
Philprene 1502	.2410 [1]
Philprene 1503	.2700 [1]
Philprene 1601	.1910 [1]
Philprene 1605	.1870 [1]
Philprene 1703	.2060 [1]
Philprene 1706	.2030 [1]
Philprene 1708	.1910 [1]
Philprene 1712	.1880 [1]
Philprene 1803	.1720 [1]
Plioflex 1006	.2410 [2]
Plioflex 1502	.2410 [2]
Plioflex 1703	.2060 [2]
Plioflex 1710	.1885 [2]
Plioflex 1773	.2060 [2]
Plioflex 1778	.1910 [2]
Polysar Krylene	.2410 [2]
Polysar Krylene NS	.2410 [2]
Polysar Krynol	.2000 [2]
Polysar Krynol NS	.2050 [2]
Polysar S	.2410 [2]
Polysar S-50	.2410 [2]
Polysar S-65	.2410 [2]
Polysar S-X 371	.2550 [2]
Polysar SS-250	.3000 [2]
S-1000	.2300 [2]
S-1001	.2300 [2]
S-1002	.2325 [2]
S-1006	.2300 [2]
S-1011	.2325 [2]
S-1013	.2300 [2]
S-1100	.1850 [2]
S-1500	.2300 [2]
S-1501	.2300 [2]
S-1502	.2300 [2]
S-1600	.1850 [2]
S-1601	.1850 [2]
S-1602	.1850 [2]
S-1703	.1950 [2]
S-1705	.1925 [2]
S-1706	.1925 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1712	.1775 [2]
S-1801	.1700 [2]
S-2000	.2275 [2]
S-2101	.2250 [2]
Synpol 1000	.2410 [2]
Synpol 1001	.2410 [2]
Synpol 1002	.2435 [2]
Synpol 1006	.2410 [2]
Synpol 1007	.2425 [2]
Synpol 1009	.2475 [2]
Synpol 1012	.2425 [2]
Synpol 1013	.2500 [2]

Butadiene-Styrene (Cont'd)

Synpol 1061	.2410 [2]
Synpol 1500	.2410 [2]
Synpol 1502	.2410 [2]
Synpol 1551	.2410 [2]
Synpol 1703	.2060 [2]
Synpol 1707	.1910 [2]
Synpol 1708	.1950 [2]
Synpol 1711	.1900 [2]

Butyl Rubbers

Enjay Butyl 035	.2300 [2]
Enjay Butyl 150	.2300 [2]
Enjay Butyl 165 NS	.2400 [2]
Enjay Butyl 215	.2300 [2]
Enjay Butyl 217	.2300 [2]
Enjay Butyl 218	.2300 [2]
Enjay Butyl 268 NS	.2400 [2]
Enjay Butyl 325	.2300 [2]
Enjay Butyl 365 NS	.2400 [2]
Polysar Butyl 100	.2450 [2]
Polysar Butyl 101	.2775 [2]
Polysar Butyl 200	.2450 [2]
Polysar Butyl 300	.2450 [2]
Polysar Butyl 301	.2550 [2]
Polysar Butyl 400	.2450 [2]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [3]
Neoprene Type GN	.4100 [2]
Neoprene Type GN-A	.4100 [2]
Neoprene Type GRT	.4200 [2]
Neoprene Type KNR	.7500 [2]
Neoprene Type S	.4200 [2]
Neoprene Type W	.3900 [2]
Neoprene Type WHV	.3900 [2]
Neoprene Type WRT	.4500 [2]
Neoprene Type WX	.4100 [2]

Silicone Rubbers*

	(prices l.c.l.)
GE (compounded)	2.50 [3]
GE Silicone Gum (not compounded)	4.00 [3]
Silastic (compounded)	1.95 [2]
Union Carbide (gums)	4.00 [3]
Union Carbide (compounds)	2.50 [3]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.4700 [3]
Thiokol Type FA	.6400 [3]
Thiokol PR-1	.9500 [3]
Thiokol Type ST	1.00 [2]

(latices—all prices per pound dry weight)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4600 [1]
Butaprene N-400	.5400 [1]
Butaprene N-401	.5400 [1]
Chemigum 200	.4900 [3]
Chemigum 235	.5400 [3]
Chemigum 236	.5400 [3]
Chemigum 245	.4600 [3]
Chemigum 246	.4600 [3]
Hycar 1512	.4600 [3]
Hycar 1551	.5400 [3]
Hycar 1552	.4600 [3]
Hycar 1561	.5400 [3]
Hycar 1562	.4600 [3]
Hycar 1571	.5900 [3]
Hycar 1572	.5100 [3]
Hycar 1577	.4600 [3]

Butadiene-Styrene Types

Copo 2101	.2800 [3]
Copo 2102	.3100 [3]

Butadiene-Styrene (Cont'd)

Copo 2105	.3100 [3]
Copo X-765	.2900 [3]
FR-S 2000	.2600 [2]
FR-S 2001	.2600 [2]
FR-S 2002	.2850 [2]
FR-S 2003	.2950 [2]
FR-S 2004	.2950 [2]
FR-S 2006	.2600 [2]
FR-S 2105	.3100 [2]
Pliolite 2101	.3000 [3]
Pliolite 2104	.3200 [3]
Pliolite 2105	.3200 [3]
Pliolite X-765	.3000 [3]
Naugatex 2000	.2630 [2]
Naugatex 2001	.2630 [2]
Naugatex 2002	.2880 [2]
Naugatex 2005	.3000 [2]
Naugatex 2006	.2630 [2]
Naugatex 2101	.2850 [2]

Butadiene-Styrene (Cont'd)

Naugatex 2105	.3120 [2]
Naugatex X-767	.3230 [2]
S 2004	.2600 [2]

Neoprene

Neoprene Latex 60	.4000 [2]
Neoprene Latex 571	.3700 [2]
Neoprene Latex 572	.3900 [2]
Neoprene Latex 601-A	.4000 [2]
Neoprene Latex 735	.3800 [2]
Neoprene Latex 736	.3800 [2]
Neoprene Latex 842-A	.3700 [2]
Neoprene Latex 950	.4700 [2]

Polysulfide Rubbers

Thiokol Type MX	.7000 [2]
Thiokol Type WD-2	.9200 [2]
Thiokol Type WD-6	.7000 [2]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid. * Covers a wide range of compounds. Readers are urged to check specific prices with producers.

Thomaston TEXTILES

for the RUBBER INDUSTRY

THOMASTON Fabrics SINCE 1900

specifically engineered to meet your needs

TIRE FABRICS • HOSE AND BELT DUCKS
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Thomaston Mills

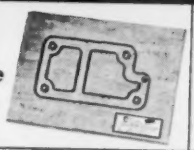
THOMASTON, GEORGIA • NEW YORK OFFICE: 40 WORTH STREET
AKRON, OHIO OFFICE: 308 AKRON SAVINGS AND LOAN BUILDING

RUBBER FABRICATORS NEED ACCURATE CUTTING DIES

For Cutting
Rubber, Neoprene, Plastics, etc.
Sheeting, Foam, Sponge, Cellular,
Cured & Uncured
Gang Dies Our Specialty

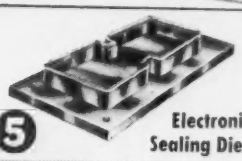
3 Mallet Handle Dies

4 Steel Rule Cutting Dies

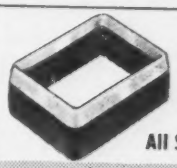


2 Steel Rule Clicker Dies

5 Electronic Sealing Dies



1 All Steel Dies



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MARKETS

(continued)

Reclaimed Rubber

According to the U. S. Department of Commerce, 108,438 long tons of reclaimed rubber were produced in the United States in the first four months of the current year. This is about 2,000 long tons more than were produced in the first four months of the preceding year.

The Department estimates that in the first four months of 1956, 101,261 long tons of reclaim were consumed. This is about 3,500 long tons less than were consumed in the comparable period of the preceding year. Stocks on hand as of May 31, 1956, totaled 34,215 long tons, some 4,000 long tons more than were on hand as of May 31, 1955.

With the approach of the vacation periods, reclaim plants can be expected to operate at high levels so as to meet demands of consumers. The two-week vacation period coincides for most reclaimers, with the end result that July shows up statistically as a slow month.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11
First Line Whole Tire	.10½
Second Line Whole Tire	.10
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.09¼
Black Carcass	.14¾
No. 1 Light Colored Carcass	.20¾
No. 1 Peel	.11
Butyl Tube Reclaim	.15
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

Scrap rubber imports during February exceeded the January arrivals, the Department of Commerce reports. February imports came to 2,847,574 pounds valued at $149,137 as compared with 2,183,163 pounds worth $135,818 during January.

It is reported that imports of scrap rubber by Western Germany in 1955 showed a substantial increase over the 1954 total. In 1955, 140,698 metric quintals of scrap rubber worth 4.8 million DM were imported, as compared with 83,971 quintals valued at 2.8 million DM in 1954. West German scrap rubber exports in 1955 totaled 56,565 quintals valued at 964,000 DM, 12% less than in 1954.

Marketwise, there have been few new developments. Trading has been generally on the quiet side. There have been no appreciable price changes during the past period.

(Prices Delivered Akron)

Mixed tires	ton	17.00
Light colored carcass	lb.	.05½
No. 1 peelings	ton	45.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	21.00
Buffings	ton	16.00
Truck and Bus S.A.G.	ton	20.00
Passenger S.A.G.	ton	17.50
Natural Rubber Red Tubes	lb.	.07½
Natural Rubber Black Tubes	lb.	.06¾
Butyl Rubber Tubes	lb.	.04

Tire Fabrics

In a recent address before the New York Society of Security Analysts, Clyde B. Morgan, president of Rayonier, Inc., stated that rayon tire cord producers made a mistake by cutting prices recently. Mr. Morgan said that rayon tire cord producers would not boost volume, and therefore profits, by their move to cut prices in line with lower nylon tire cord quotations.

Suppliers of rayon cord, he observed, would have been better off had they maintained their prices and used funds to improve quality and durability of the products and provide better services to users. Because of his own company's diversification policy, he declared, rayon tire cord represents a "relatively small" part of its total sales. "Even in the unlikely event that rayon tire cord consumption should decline, we could not be hurt to any great extent," Mr. Morgan said.

Notes Record Production

The Textile Economics Bureau reports that world production of man-made fibers reached an all-time record high of 5,579,000,000 pounds in 1955, a rise of 14% above the 4,902,000,000 pounds produced in 1954. The 1955 total was composed of 4,533,000,000 pounds of rayon, 484,000,000 pounds of acetate and 562,000,000 pounds of non-cellulosic man-made fibers.

Rayon output increased 12½% over the previous year, and acetate production was up 7% while production of the non-cellulosic fibers increased 35½%. The United States accounted for 67½% of the 1955 non-cellulosic total as compared with 69% in the previous year.

Heavy Fabric Stock Cut

The trade reports that stocks of industrial fabrics in the hands of many users are down to low levels. Many consumers have been drawing upon inventories to a great extent to meet operating needs and buying only fill-in lots.

The low level of inventories among many users of industrial goods is not a cause of concern in trading circles because there is an ample supply of most fabrics which can be picked up readily for quick or nearby delivery. The situation could become serious if a sudden surge of buying developed but such a development is not anticipated in the near future. All factors point to a continuing slow and slightly easy market for a number of weeks ahead. A number of consumers are seeking deliveries before plant vacation closings which in many cases fall in early July.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.76
1650	lb.	.70
2200	lb.	.70½

Nylon Tire Cord

210	lb.	1.95
840	lb.	1.80

Rayon Graded Fabric

1100	lb.	.72
1650	lb.	.66½
2200	lb.	.66

Cotton Chafers

14.4 oz. (per square yard)	lb.	.70
9.25 oz. (per square yard)	lb.	.65
11.65 oz. (per square yard)	lb.	.61
8.9 oz. (per square yard)	lb.	.67

Liquid Latex

Natural: The exceptional demand for Malayan latex, which in the past few years has sent up exports by over 100%, has been temporarily halted by the cut-back in the U.S. motor car industry and by British credit restrictions. Total latex exports in the first five months of this year fell by 14.9% to 40,160 long tons, compared with the corresponding period last year.

In the first four months of this year, 25,799 long tons of latex were imported into the U. S. This is slightly more than 4,000 long tons above imports in the first four months of the preceding year. Consumption in the first four months of this year at 25,063 long tons is about 5,000 long tons less than in the corresponding period of 1955. Current prices for Hevea latex, in bulk, average 35c per pound at East Coast ports.

Synthetic: Production of S-type latex in the first four months of the current year has been set at 25,551 long tons by the U. S. Department of Commerce. In the first four months of the previous year, 24,177 long tons were produced. The Department states that in the first four months of 1956, 22,385 long tons were consumed, against the 20,488 long tons consumed in the first four months of 1955.

The figures to date would indicate that slightly more than the 68,561 long tons of S-type latex which were produced in 1955 will be produced in 1956. Of course, there is always the possibility that price fluctuations on the natural side may cause greater quantities of S-type latex to be produced and consumed. It would be safe to assume at this point, however, that production of S-type latex will approximate 70,000 long tons in 1956.

Cotton

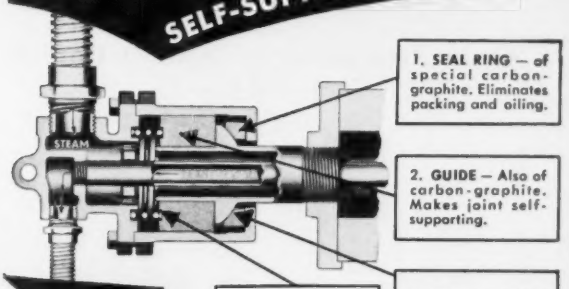
The price of middling uplands on the New York Cotton Exchange has moved in the rather narrow range of 120 points since our last report (June 1), high for the period being 36.90c reached on June 19 and again on June 20, and low being 35.70c reached on June 11. The average price of middling uplands for the month of June was 36.67c based on 21 trading days. This compares with an average of 36.65c in May.

The Agriculture and Commerce Departments are surveying what may develop into a critical shortage of cotton bale ties by September if the present steel industry walkout continues for some time. Officials explained that the Tennessee Coal and Iron Division of U.S. Steel, which supplies about 75% of all the steel bale ties used in this country, has been out on strike for several weeks.

Another big supplier, Atlantic Steel Co. of Atlanta, Ga., has been producing ties but presumably will be closed down as a result of the steel industry strike. The cotton industry uses about nine pounds of ties per bale of cotton and another 14,500,000 bale crop this year would run seasonal demands up to levels that could not be met from inventories and imports.

The British Board of Trade has announced arrangements to smooth the way for increased use of dollar funds made available under MSA for purchases of cotton from U.S. and other dollar areas. It is understood that only $4,000,000 from $24,000,000 authorized has been used to date. The new arrangements will exclude raw cotton from general licensing as of July 4.

JOHNSON Rotary Pressure JOINT
SELF-SUPPORTING TYPE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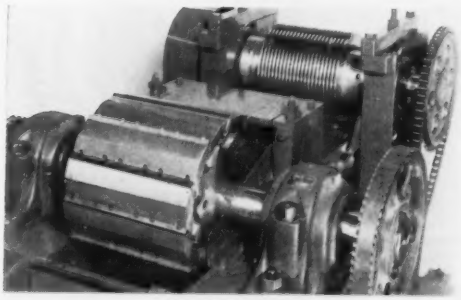

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STATISTICS of the industry

PERTINENT INDUSTRY DATA

Natural Rubber in the United States

(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1931	501,788	355,200	25,609	322,000
1932	414,668	336,700	20,937	379,000
1933	418,902	412,400	20,576	365,000
1934	463,018	462,500	23,856	355,000
1935	467,146	495,500	11,391	303,000
1936	488,145	575,000	12,582	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1952	805,997	453,846	3,024	95,260
1953	647,150	553,473	8,376	112,316
1954	596,848	596,285	7,443	104,543
1955	634,800	596,285	10,611	110,105
1955:				
Mar.	61,250	58,472	691	102,058
Apr.	61,113	53,781	892	101,620
May	61,042	54,746	683	106,650
June	52,762	56,282	682	101,491
July	43,626	46,166	906	105,782
Aug.	59,840	48,359	810	109,056
Sept.	50,459	50,963	980	113,185
Oct.	45,720	54,995	869	110,795
Nov.	50,509	52,769	1,102	103,764
Dec.	50,556	48,565	986	109,854
1956:				
Jan.	58,803	53,374	1,877	111,943
Feb.	53,353	50,285	752	111,832
Mar.	52,749	50,040	505	108,974
Apr.	51,394	46,961	....	108,840

Source: U. S. Department of Commerce.

U. S. Imports of Natural Rubber

Year	Dry: Long Tons	Dry: Declared Value	Latex: Long Tons	Latex: Declared Value	Total Imports
1935	453,134	115,299,448	13,553	3,782,222	466,687
1936	467,064	152,072,496	19,852	6,659,899	486,916
1937	574,600	237,307,041	23,185	10,213,670	597,785
1938	397,640	125,373,864	11,944	4,168,127	409,584
1939	469,946	167,586,780	27,437	10,467,552	497,383
1940	781,202	303,308,823	33,789	14,593,466	814,991
1941	989,498	401,976,317	34,797	15,965,627	1,024,245
1942	266,276	112,537,426	10,646	5,630,667	276,922
1943	50,358	31,369,198	1,890	1,312,202	52,248
1944	103,847	73,908,549	3,091	2,092,211	106,938
1945	134,408	95,814,102	4,773	3,115,853	139,181
1946	376,502	228,796,110	8,421	5,843,085	384,923
1947	691,087	306,951,814	17,542	9,787,722	708,629
1948	702,293	290,849,177	32,745	18,288,223	735,038
1949	630,808	225,343,624	29,743	14,968,650	660,551
1950	747,109	416,222,598	54,401	41,764,486	801,510
1951	677,874	727,343,348	54,963	80,178,309	732,837
1952	756,987	578,179,519	48,228	40,563,116	805,215
1953	571,635	284,909,223	75,511	46,353,333	647,146
1954	522,364	219,098,143	74,483	42,755,029	596,847
1955	542,507	360,435,303	92,825	80,163,114	635,332
1955:					
Mar.	53,639	33,482,831	7,611	5,987,304	61,250
Apr.	52,563	33,425,499	8,549	7,235,327	61,112
May	52,192	32,621,824	8,849	6,968,726	61,041
June	45,025	27,959,320	7,736	6,015,080	52,761
July	34,924	21,653,274	8,702	6,855,619	43,626
Aug.	50,954	32,782,273	8,886	7,071,971	59,840
Sept.	42,350	29,854,781	8,108	7,902,094	50,458
Oct.	38,820	30,746,494	6,900	7,539,732	45,720
Nov.	43,423	34,989,275	7,085	8,063,930	50,508
Dec.	41,759	34,512,483	6,436	6,853,858	48,195
1956:					
Jan.	48,476	38,397,341	10,328	10,355,488	58,804
Feb.	45,682	35,983,385	7,670	7,814,076	46,449
Mar.	44,947	35,238,125	7,791	7,507,686	52,738

Source: Bureau of the Census, U. S. Department of Commerce.

World Production of Natural Rubber

(Including Latex)

(Long Tons)

Year	Malaya	Indonesia	Ceylon	Viet Nam & Cambodia	Latin America	Rest of World*	Total*
1944	25,000*	50,000*	98,500	60,419	49,946	77,000	360,000
1945	8,600*	10,000*	97,500	12,000*	47,125	73,570	250,000
1946	403,719	175,000*	94,000	19,975	39,678*	105,080	837,500
1947	646,362	277,951	89,000	38,128	34,928*	172,782	1,260,000
1948	698,189	432,349	95,000	43,935	29,158*	225,557	1,525,000
1949	671,503	432,996	89,500	43,010	27,318*	225,659	1,490,000
1950	694,090	696,472	113,500	48,482	26,902*	280,299	1,860,000
1951	605,346	814,406	105,000	52,136	29,777*	278,262	1,885,000
1952	584,238	750,494	96,500	63,134	35,475*	261,211	1,790,000
1953	574,390	692,164	98,610	74,545	35,318*	250,182	1,725,000
1954	584,435	738,670	93,935	78,024	26,833*	280,112	1,802,500
1955	639,128	733,786	93,830	80,172	6,000*	344,584	1,897,500
1955:							
Sept.	56,190	65,357	7,797	8,796	1,939	29,921	170,000
Oct.	54,835	66,814	9,307	9,819	1,708	30,017	172,500
Nov.	52,084	60,673	9,602	10,137	2,466	25,038	160,000
Dec.	62,222	94,681	11,654	13,435	1,022	29,482	212,500
1956:							
Jan.	59,085	40,941	9,015	9,845	500*	30,614	150,000
Feb.	51,818	43,927	4,578	....	500*	31,677	132,500
Mar.	51,023	37,913	5,179	....	500*	35,385	130,000

Source: International Rubber Study Group. * Estimated.

World Consumption of Natural and Synthetic Rubber

(Including Latex)

(Long Tons)

Year	United States	United Kingdom	Canada	Europe*	Rest of World*	Total*
1944	710,783	86,977	34,310	132,500	160,690	1,125,000
1945	799,009	91,047	41,836	87,500	108,164	1,127,500
1946	1,039,296	126,770	39,196	145,000	115,804	1,467,500
1947	1,122,327	156,399	61,452	242,500	153,548	1,735,000
1948	1,069,404	196,286	62,121	392,000	182,379	1,902,500
1949	988,903	186,622	56,362	446,500	207,388	1,887,500
1950	1,258,557	222,425	68,695	448,500	287,055	2,285,000
1951	1,214,298	238,101	70,809	476,500	314,941	2,312,500
1952	1,261,413	202,179	67,099	550,000	254,901	2,335,000
1953	1,338,309	211,453	73,394	521,000	343,606	2,500,000
1954	1,233,012	247,612	71,656	544,250	408,094	2,505,000
1955	1,529,699	266,804	84,528	614,250	480,000	2,980,000
1955:						
Aug.	121,081	17,538	5,554	40,500	32,827	217,500
Sept.	127,338	21,680	7,697	48,250	32,535	237,500
Oct.	135,372	25,484	7,416	64,250	29,978	262,500
Nov.	134,430	22,335	8,570	65,250	30,915	267,500
Dec.	131,653	24,913	7,718	73,250	37,466	275,000
1956:						
Jan.	132,231	24,819	7,329	59,250	38,871	262,500
Feb.	125,525	20,993	7,479	66,000	35,003	255,000
Mar.	127,879	19,128	7,367	.....	93,126	247,500

Source: International Rubber Study Group. * Estimated.

Rim Production

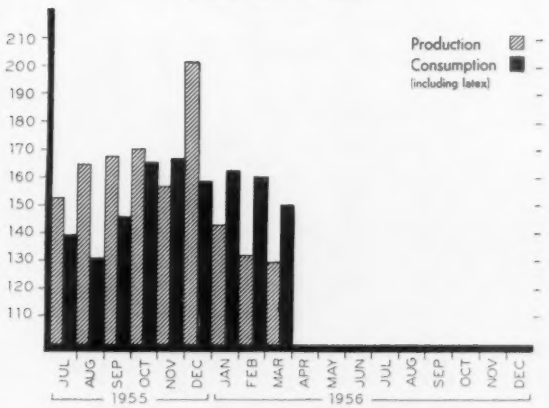
	1951	1952	1953	1954	1955
Passenger Car	29,145,367	24,936,844	31,318,461	25,952,322	38,092,080
Truck & Bus	6,877,419	5,752,674	5,228,321	4,463,689	6,642,329
Agricultural	3,019,581	2,073,116	1,943,487	1,297,040	1,931,768
Earth Mover	28,026	31,791	24,685	21,536	38,859
Total	39,070,393	32,794,425	38,514,954	31,734,587	46,705,036

	1955	1956				
	Dec.	Jan.	Feb.	Mar.	Apr.	May
Passenger Car	3,224,232	2,911,466	2,507,445	2,755,696	2,386,695	2,142,707
Truck & Bus	492,964	620,729	553,303	541,861	532,293	621,532
Agricultural	203,534	183,462	164,168	198,272	108,515	98,856
Earth Mover	4,084	5,930	6,096	7,952	6,562	3,802
Total	3,924,814	3,721,587	3,231,012	3,503,781	3,034,065	2,866,897

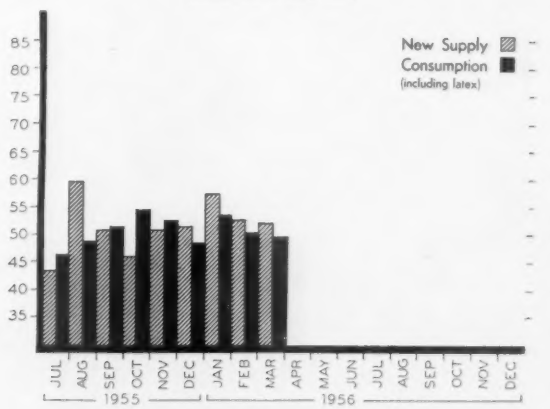
Source: The Tire & Rim Association, Inc.

STATISTICS at a glance

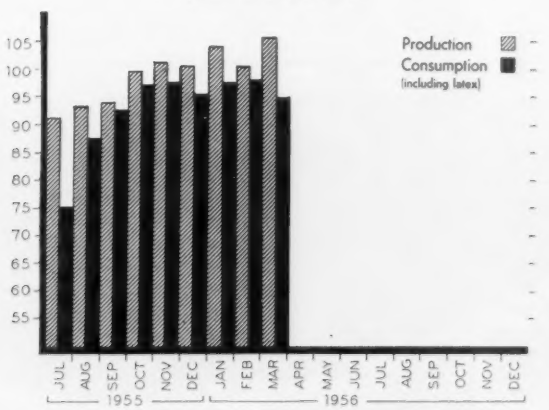
NATURAL RUBBER—WORLD
(thousands of long tons)



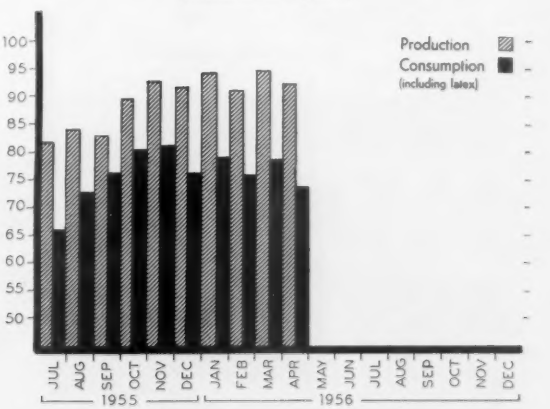
NATURAL RUBBER—UNITED STATES
(thousands of long tons)



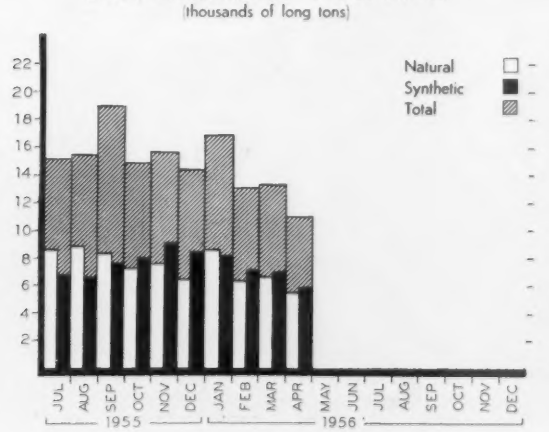
SYNTHETIC RUBBER—WORLD
(thousands of long tons)



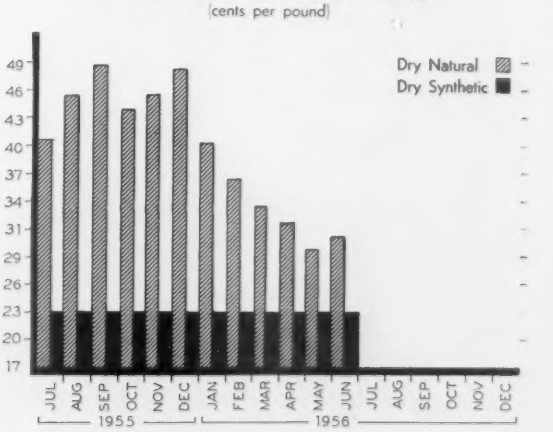
SYNTHETIC RUBBER—UNITED STATES
(thousands of long tons)



LATEX CONSUMPTION—UNITED STATES
(thousands of long tons)



PRICES—NATURAL AND SYNTHETIC
(cents per pound)



Synthetic Rubber in the United States

(All Quantities in Long Tons)

New Supply

Year	GR-S	Neoprene	Butyl	N-Type	Total
1949	310,539	35,215	54,046	11,072	410,932
1950	378,887	50,067	60,915	12,037	501,906
1951	704,529	58,907	76,475	15,333	855,244
1952	654,854	65,745	81,630	16,228	818,447
1953	680,728	80,495	79,801	20,198	861,222
1954	490,405	69,150	58,802	21,396	639,753
1955	801,145	91,357	56,179	32,623	982,304
1955:					
June	65,456	5,919	3,872	3,422	78,669
July	66,550	6,904	5,395	3,195	82,044
Aug.	68,898	8,511	4,203	2,792	84,404
Sept.	68,228	7,677	5,097	2,821	83,823
Oct.	73,103	8,118	5,501	2,958	89,680
Nov.	75,745	8,537	4,935	2,931	92,148
Dec.	74,794	8,455	4,710	3,068	91,027
1956:					
Jan.	76,028	8,207	6,896	3,125	94,256
Feb.	73,457	8,560	6,229	2,989	91,235
Mar.	77,812	7,822	5,686	3,663	94,983
Apr.	73,947	8,481	5,553	3,621	91,602

Consumption

1949	299,420	31,753	50,855	8,827	414,381
1950	416,230	43,781	66,348	11,930	538,289
1951	626,444	48,887	70,500	13,066	758,897
1952	666,420	55,522	71,229	13,866	807,037
1953	624,181	65,900	77,826	16,929	784,836
1954	500,345	57,203	61,464	17,715	636,727
1955	741,997	72,876	53,991	26,035	894,899
1955:					
June	72,256	6,320	4,704	2,581	85,861
July	55,610	4,294	3,894	1,621	65,419
Aug.	59,746	6,450	4,307	2,219	72,722
Sept.	63,330	6,197	4,578	2,270	76,375
Oct.	66,744	6,626	4,739	2,280	80,389
Nov.	68,111	6,896	4,420	2,234	81,661
Dec.	63,137	6,496	4,197	2,113	75,943
1956:					
Jan.	65,375	6,684	4,223	2,198	78,480
Feb.	62,366	6,430	4,155	2,289	75,240
Mar.	64,458	6,542	4,515	2,373	77,888
Apr.	61,315	6,123	4,232	2,021	73,691

Exports

1949	1,401	3,330	178	1,574	6,483
1950	900	4,826	31	1,895	7,652
1951	483	6,825	216	1,725	9,249
1952	9,467	9,813	126	2,695	22,101
1953	7,692	11,494	237	3,245	22,668
1954	11,069	12,062	2,831	4,155	30,117
1955	60,704	18,098	9,895	4,593	93,290
1955:					
June	6,030	1,541	726	389	8,686
July	5,212	1,275	870	472	7,829
Aug.	7,727	1,454	837	386	10,407
Sept.	8,598	1,946	526	602	11,672
Oct.	7,888	1,748	1,041	444	11,121
Nov.	7,786	1,824	894	306	10,810
Dec.	7,837	1,786	968	375	10,966
1956:					
Jan.	7,550	1,757	815	506	10,628
Feb.	9,018	1,521	1,624	449	12,612
Mar.	10,804	1,500	764	522	13,590

Stocks

1949	77,731	4,654	12,224	3,433	98,042
1950	36,942	5,733	7,243	2,840	52,758
1951	105,271	8,379	12,481	3,821	129,912
1952	83,861	8,535	22,716	3,875	118,987
1953	135,153	11,480	24,866	4,346	175,845
1954	115,499	11,349	19,267	4,280	150,395
1955	108,989	12,220	10,500	6,030	137,739
1955:					
June	103,844	9,755	13,053	4,042	130,694
July	110,281	11,213	13,288	5,120	139,902
Aug.	108,211	11,326	12,395	5,118	137,050
Sept.	107,746	11,209	12,190	4,995	136,140
Oct.	105,746	11,820	12,146	5,041	134,753
Nov.	105,287	11,530	11,646	5,201	133,664
Dec.	108,136	11,971	10,223	5,300	135,630
1956:					
Jan.	111,263	11,850	12,303	6,316	141,732
Feb.	114,389	11,888	13,027	6,602	145,906
Mar.	118,063	12,037	13,458	7,437	150,995
Apr.	122,277	11,723	13,978	8,020	155,998

Source: U. S. Department of Commerce.

Natural and Synthetic Rubber Latex in the United States

(All Quantities in Long Tons)

New Supply

Year	Natural	GR-S	Neoprene	N-Type	Total Synthetic	Grand Total
1944	3,090	6,580	4,683	.....	11,263	14,353
1945	4,768	15,176	7,077	.....	22,253	27,021
1946	8,012	24,810	13,595	.....	38,405	46,417
1947	17,675	22,474	6,089	.....	28,563	46,238
1948	32,630	21,494	5,022	.....	26,516	59,146
1949	29,974	21,357	3,651	.....	25,008	54,982
1950	54,401	31,339	5,725	.....	37,064	91,465
1951	54,963	32,972	6,866	2,948	42,786	97,749
1952	48,228	42,273	7,598	4,164	54,035	102,263
1953	75,511	48,112	9,026	5,844	62,982	138,493
1954	74,483	48,379	8,214	6,866	63,459	137,942
1955	92,754	69,364	10,432	10,798	90,594	183,348
1955:						
Mar.	7,611	7,078	854	672	8,604	16,215
Apr.	8,550	5,680	975	1,022	7,677	16,527
May	8,849	5,292	880	808	6,980	15,829
June	7,736	4,688	905	1,434	7,027	14,763
July	8,702	4,753	641	993	6,387	15,089
Aug.	8,885	4,456	881	917	6,254	15,139
Sept.	8,109	5,698	994	1,086	7,778	18,887
Oct.	6,900	6,231	922	883	8,036	14,936
Nov.	7,085	6,933	1,004	781	8,718	15,803
Dec.	6,018	6,407	962	874	8,243	14,261
1956:						
Jan.	10,328	6,885	848	919	8,652	18,890
Feb.	7,671	6,943	930	827	8,700	16,371
Mar.	7,800	5,911	782	1,158	7,851	15,651
Apr.	6,995	6,066	969	866	7,901	14,896

Consumption[1]

1944	6,085	6,000	4,400	....	10,400	16,485
1945	3,886	14,500	6,800	....	21,300	25,186
1946	5,714	23,500	13,000	....	36,500	42,214
1947	13,909	22,500	6,500	....	29,000	42,909
1948	28,489	21,500	5,250	....	26,750	55,239
1949	36,117	21,500	3,750	....	25,250	61,367
1950	56,138	31,000	5,500	....	36,500	92,638
1951	46,750	31,031	6,279	2,628	39,938	86,688
1952	53,567	40,562	7,368	3,093	51,023	104,590
1953	67,375	46,473	7,981	3,654	58,108	125,483
1954	75,931	44,173	7,251	4,507	55,931	131,862
1955	86,478	63,982	8,736	8,495	81,213	167,691
1955:						
Mar.	8,415	5,861	828	509	7,198	15,613
Apr.	7,732	5,209	748	601	6,558	14,290
May	6,643	4,728	768	493	5,989	12,632
June	6,589	4,885	722	587	6,194	12,783
July	5,469	3,830	535	626	4,991	10,460
Aug.	6,784	4,514	770	810	6,094	12,878
Sept.	7,452	5,505	730	878	7,113	14,565
Oct.	7,209	5,704	739	614	7,057	14,266
Nov.	6,620	5,954	829	603	7,386	14,006
Dec.	6,473	5,719	768	538	7,025	13,498
1956:						
Jan.	6,776	5,858	772	670	7,300	14,076
Feb.	6,399	5,913	787	730	7,430	13,829
Mar.	6,438	5,888	729	781	7,398	13,836
Apr.	5,450	4,726	699	475	5,900	11,350

Stocks at End of Period

1944	2,443	....	....	....	....	2,443
1945	3,121	....	....	....	....	3,121
1946	4,865	....	....	....	....	4,865
1947	5,033	....	....	....	....	5,033
1948	11,235	....	....	....	....	11,235
1949	5,063	....	....	....	....	5,063
1950	4,927	....	....	....	....	4,927
1951	4,752	3,727	1,245	532	5,504	10,256
1952	6,201	5,040	1,019	902	6,961	13,162
1953	13,532	4,794	1,117	721	6,632	20,164
1954	11,133	5,134	1,087	811	7,032	18,165
1955	13,203	6,980	1,236	1,807	10,203	23,406
1955:						
Mar.	7,820	6,940	909	637	8,486	16,306
Apr.	6,790	7,098	786	703	8,587	15,377
May	8,854	7,021	767	817	8,605	17,459
June	9,788	6,645	817	883	8,335	18,123
July	11,934	6,950	850	1,397	9,197	21,131
Aug.	11,962	6,201	885	1,319	8,405	20,367
Sept.	12,595	6,448	975	1,527	8,950	21,545
Oct.	12,156	5,798	1,075	1,196	8,069	20,225
Nov.	12,616	6,307	1,089	1,174	8,570	21,186
Dec.	12,645	6,357	1,155	1,248	8,760	21,405
1956:						
Jan.	16,059	6,522	1,093	1,906	9,521	25,580
Feb.	16,735	7,011	1,162	1,943	10,116	26,851
Mar.	18,309	6,867	1,097	2,340	10,304	28,613
Apr.	21,077	7,199	1,071	1,695	9,965	31,042

Source: U. S. Department of Commerce.
Note: (1) GR-S and Neoprene consumption estimated through 1950

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Rubber Industry Employment Earnings and Hours

All Rubber Products

Mo.	1955 Production Workers (thousands)	1955 Average Weekly Earnings	1955 Average Weekly Hours	1955 Average Hourly Earnings	1956 Production Workers (thousands)	1956 Average Weekly Earnings	1956 Average Weekly Hours	1956 Average Hourly Earnings
Jan.	208.5	$83.84	41.3	$2.03	232.5	$87.91	40.7	$2.16
Feb.	209.4	84.25	41.3	2.04	228.2	85.81	40.1	2.14
Mar.	211.6	83.64	41.0	2.04	226.1	....	....	....
Apr.	210.9	86.53	41.8	2.07	....	....	....	....
May	215.7	87.36	42.0	2.08	....	....	....	....
June	219.0	88.83	42.3	2.10	....	....	....	....
July	215.7	86.32	41.3	2.09	....	....	....	....
Aug.	216.8	86.32	41.3	2.09	....	....	....	....
Sept.	223.1	86.74	41.5	2.09	....	....	....	....
Oct.	226.4	89.04	42.0	2.12	....	....	....	....
Nov.	231.2	92.01	42.4	2.17	....	....	....	....
Dec.	233.9	89.21	41.3	2.16	....	....	....	....

Tires and Tubes

Jan.	85.3	97.41	41.1	2.37	94.1	101.00	40.4	2.50
Feb.	86.5	96.46	40.7	2.37	93.8	97.96	39.5	2.48
Mar.	87.4	95.51	40.3	2.37	....	....	....	....
Apr.	88.6	102.18	42.4	2.41	....	....	....	....
May	89.8	101.88	42.1	2.42	....	....	....	....
June	91.0	105.60	43.1	2.45	....	....	....	....
July	91.5	103.33	42.7	2.42	....	....	....	....
Aug.	91.0	102.72	42.1	2.44	....	....	....	....
Sept.	91.9	101.02	41.4	2.44	....	....	....	....
Oct.	92.3	103.74	42.0	2.47	....	....	....	....
Nov.	94.2	106.26	42.0	2.53	....	....	....	....
Dec.	94.7	99.50	39.8	2.50	....	....	....	....

Rubber Footwear

Jan.	22.1	68.97	40.1	1.72	26.2	74.37	40.2	1.85
Feb.	21.5	69.72	40.3	1.73	26.1	74.74	40.4	1.85
Mar.	21.5	69.72	40.3	1.73	....	....	....	....
Apr.	21.3	70.82	40.7	1.74	....	....	....	....
May	21.3	70.07	40.5	1.73	....	....	....	....
June	21.6	71.34	41.0	1.74	....	....	....	....
July	21.8	70.99	40.8	1.74	....	....	....	....
Aug.	21.5	67.25	39.1	1.72	....	....	....	....
Sept.	23.5	67.60	39.3	1.72	....	....	....	....
Oct.	24.4	69.20	40.0	1.73	....	....	....	....
Nov.	25.5	77.89	42.1	1.85	....	....	....	....
Dec.	26.2	74.89	40.7	1.84	....	....	....	....

All Other Rubber Products

Jan.	101.1	76.08	41.8	1.82	112.2	79.73	41.1	1.94
Feb.	101.4	76.86	42.0	1.83	108.3	77.76	40.5	1.92
Mar.	102.7	76.49	41.8	1.83	....	....	....	....
Apr.	101.0	76.54	41.6	1.84	....	....	....	....
May	104.6	78.68	42.3	1.86	....	....	....	....
June	106.4	77.93	41.9	1.86	....	....	....	....
July	102.4	74.37	40.2	1.85	....	....	....	....
Aug.	104.3	75.85	41.0	1.85	....	....	....	....
Sept.	107.7	78.96	42.0	1.88	....	....	....	....
Oct.	109.7	80.56	42.4	1.90	....	....	....	....
Nov.	111.5	83.03	42.8	1.94	....	....	....	....
Dec.	113.0	83.69	42.7	1.96	....	....	....	....

Source: U. S. Department of Labor.

Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who work during, or received pay for, any part of the pay period ending nearest the 15th of the month. These employment series have been adjusted to first quarter 1954 benchmark levels indicated by data from government social insurance programs. Hours and earnings data pertain only to production and related workers.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1949	1950	1951	1952	1953	1954	1955	1956
Jan.	33.37	31.89	45.04	42.96	33.24	34.15	35.07	35.24
Feb.	33.41	32.79	(a)	41.64	33.76	35.00	35.04	36.26
Mar.	33.44	32.65	46.06	41.70	34.10	35.23	34.33	36.70
Apr.	33.84	33.23	46.06	41.79	33.85	35.22	34.23	36.81
May	33.73	33.64	46.06	39.98	34.30	35.34	34.80	36.65
June	33.56	34.61	46.06	41.31	34.11	35.17	34.83	36.67
July	32.99	38.11	46.21	40.37	34.20	35.37	34.61	....
Aug.	32.06	38.93	35.93	40.42	33.82	35.19	34.53	....
Sept.	30.94	41.62	36.20	39.75	33.69	35.46	33.85	....
Oct.	30.32	40.66	38.13	37.52	33.53	35.24	33.93	....
Nov.	30.52	43.11	42.70	35.59	33.60	34.80	34.87	....
Dec.	31.08	43.37	43.32	33.76	33.52	35.03	34.95	....
Average for Year	32.44	37.05	42.43	39.71	33.81	35.10	34.59	....

Note: The Government established a ceiling price of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Production Index for the Rubber Industry

(1947-1949 = 100)

(Based on man-hours)

	1954	1955	1956		1954	1955	1956
Jan.	114	145	148	July	85	121	...
Feb.	114	144	148	Aug.	94	133	...
Mar.	118	146	141	Sept.	118	144	...
Apr.	116	147	...	Oct.	132	155	...
May	118	146	...	Nov.	124	150	...
June	121	151	...	Dec.	128	139	...

Sales by the Rubber Industry

(in Millions of Dollars*)

	1954	1955	1956		1954	1955	1956
Jan.	361	424	415	July	393	471	...
Feb.	360	440	445	Aug.	352	456	...
Mar.	378	466	451	Sept.	346	456	...
Apr.	382	445	...	Oct.	346	447	...
May	378	465	...	Nov.	404	482	...
June	385	465	...	Dec.	417	465	...

Rubber Manufacturers' Inventories

(in Millions of Dollars*)

	1954	1955	1956		1954	1955	1956
Jan.	835	790	935	July	787	853	...
Feb.	848	782	970	Aug.	754	863	...
Mar.	844	805	979	Sept.	799	874	...
Apr.	813	784	...	Oct.	835	902	...
May	798	810	...	Nov.	811	935	...
June	817	850	...	Dec.	821	934	...

Source: U. S. Department of Commerce.
Notes: * Adjusted for seasonal variation.

No. 1 R.S.S.—Annual Average Prices

(New York Market—Cents per Pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1914	93	56	65.33	1935	13¾	10½	12.37
1915	79	58½	65.85	1936	23	13½	16.41
1916	102	55	72.50	1937	26⅞	14	19.39
1917	90	52	72.23	1938	17⅞	10¼	14.64
1918	70	40	60.15	1939	24	14⅛	17.57
1919	57	38½	48.70	1940	24	18¼	20.10
1920	56½	16	36.30	1941	24⅞	19⅛	22.40
1921	21¼	11½	16.36	1942	22½	22½	22.50
1922	28⅜	13⅝	17.50	1943	22½	22½	22.50
1923	37⅛	24¾	29.45	1944	22½	22½	22.50
1924	40⅛	17⅝	26.20	1945	22½	22½	22.50
1925	121	34¾	72.46	1946	22½	22½	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¾	33	37.72	1948	25	18	21.99
1928	41¼	17	22.48	1949	19¾	15⅞	17.57
1929	26⅞	15½	20.55	1950	86	18	41.10
1930	16½	7½	11.98	1951	76	52	(a)
1931	8⅝	4¼	6.17	1952*	33	26½	29.15
1932	4¼	2½	3.49	1953	31⅞	19¾	24.21
1933	9⅞	2⅞	5.96	1954	34½	19½	23.61
1934	15⅞	8¾	12.92	1955	52	29⅜	39.16

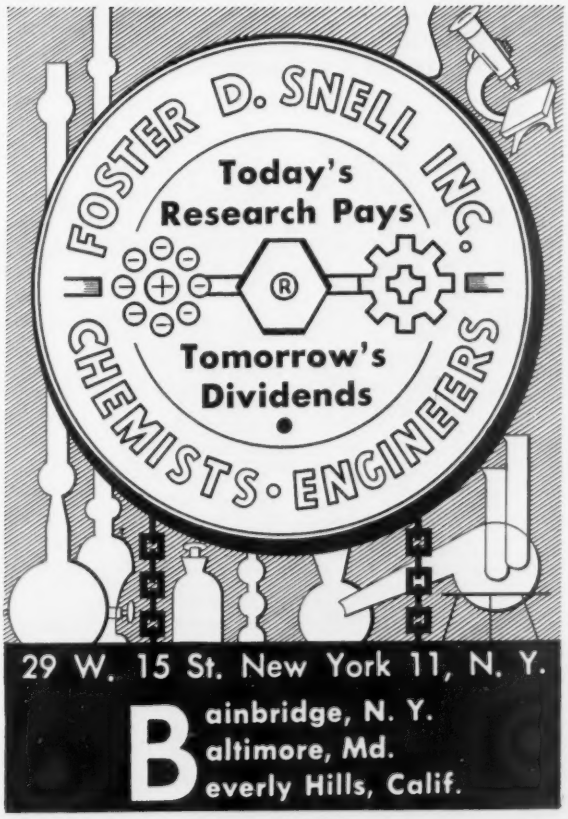
Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year. * Free trading was resumed on July 1, 1952; figures represent only July through December, 1952.

No. 1 R.S.S.—Monthly Average Prices

(New York Market—Cents per pound)

	1949	1950	1951	1952	1953	1954	1955	1956
Jan.	19.23	18.33	71.21	....	29.40	20.22	33.92	41.70
Feb.	18.49	19.40	73.61	....	27.57	19.98	34.90	36.46
Mar.	19.08	19.86	72.05	....	26.59	20.16	31.08	33.68
Apr.	18.53	23.51	....	....	24.66	22.06	31.75	31.74
May	17.92	28.07	....	....	25.52	21.96	31.35	29.61
June	16.36	30.92	....	....	24.42	23.01	34.74	30.54
July	16.45	39.10	....	30.52	23.64	24.12	40.84	....
Aug.	16.60	51.63	....	29.36	23.36	23.26	45.85	....
Sept.	17.58	55.98	....	27.42	23.06	23.99	48.27	....
Oct.	16.31	62.19	....	27.26	20.82	26.57	43.81	....
Nov.	16.70	73.05	....	29.25	20.58	28.07	44.95	....
Dec.	17.53	71.20	....	31.26	20.92	29.88	48.40	....
Average for Year	17.57	41.10	(*)	29.15	24.21	23.61	39.16	....

Note: (*) Free trading suspended March 31, 1951, and resumed on July 1, 1952.



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Check Motions or Dimensions
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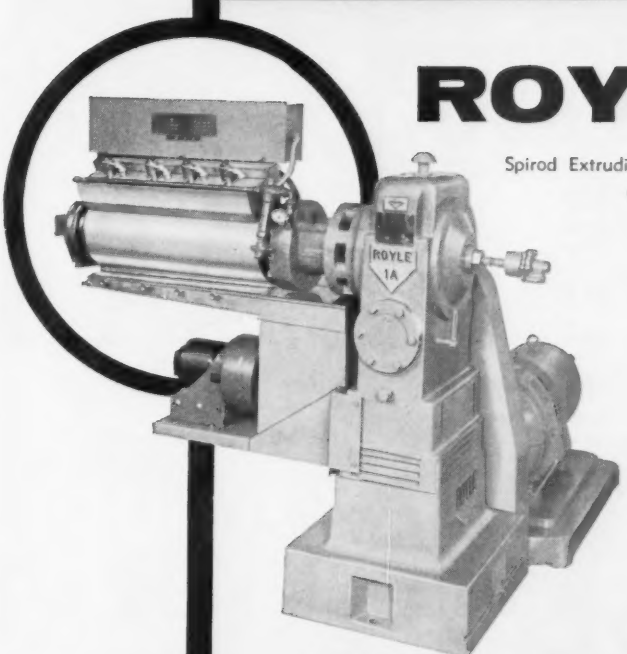
Spirod Extruding Machine with electric heating and high velocity evaporative cooling. An all-purpose extruding machine for processing rubber and plastics. Available in sizes 1⅛" through 12" cylinder bore.



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ROYLE PATERSON N. J. 1880

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Akron, Ohio — J. C. Clinefelter — SWandale 4-5020
Los Angeles, Cal. — H. M. Royal, Inc. — LOgan 3261

PATERSON 3, NEW JERSEY

Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,845	49,148	1,787	77,781	81,314	10,698
Passenger Car	21,589	41,295	656	63,540	66,738	8,773
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949 (total)	31,584	43,466	1,467	76,517	76,369	10,638
Passenger Car	28,129	36,440	509	65,077	62,140	8,904
Truck and Bus	3,456	7,026	958	11,440	11,228	1,734
1950 (total)	41,349	56,808	1,430	99,587	92,754	3,794
Passenger Car	36,678	47,103	642	84,423	78,598	3,050
Truck and Bus	4,671	9,705	788	15,164	14,156	743
1951 (total)	32,153	44,612	1,677	78,442	83,405	8,765
Passenger Car	26,729	34,226	723	61,678	65,546	6,973
Truck and Bus	5,424	10,386	954	16,764	17,859	1,791
1952 (total)	29,484	54,342	1,520	85,346	90,411	14,110
Passenger Car	24,106	45,458	741	70,305	74,341	11,251
Truck and Bus	5,378	8,884	779	15,041	16,070	2,859
1953 (total)	37,949	55,124	1,543	94,617	96,150	15,720
Passenger Car	33,106	45,798	809	79,713	81,455	13,044
Truck and Bus	4,843	9,326	734	14,904	14,696	2,676
1954 (total)	33,333	55,155	1,753	90,241	89,141	14,762
Passenger Car	29,741	47,044	928	77,713	76,794	12,217
Truck and Bus	3,591	8,111	826	12,528	12,347	2,545
1955 (total)	47,374	59,246	1,879	108,499	112,178	18,778
Passenger Car	42,574	50,189	966	93,730	97,223	15,963
Truck and Bus	4,800	9,057	912	14,769	14,955	2,815
1955:						
July (total)	3,890	5,711	128	9,729	9,027	14,684
Passenger Car	3,461	4,802	76	8,339	7,893	12,199
Truck and Bus	429	909	51	1,389	1,134	2,485
Aug. (total)	3,362	5,980	119	9,462	8,717	13,908
Passenger Car	2,984	5,058	60	8,103	7,585	11,636
Truck and Bus	378	922	59	1,359	1,132	2,272
Sept. (total)	3,142	5,170	140	8,453	9,125	14,674
Passenger Car	2,749	4,366	74	7,189	7,882	12,407
Truck and Bus	393	804	66	1,264	1,242	2,267
Oct. (total)	3,495	4,460	161	8,117	9,555	16,163
Passenger Car	3,172	3,556	74	6,802	8,160	13,806
Truck and Bus	324	904	88	1,315	1,395	2,357
Nov. (total)	4,303	3,592	150	8,045	9,603	17,727
Passenger Car	3,900	2,902	63	6,865	8,198	15,142
Truck and Bus	403	690	87	1,180	1,405	2,585
Dec. (total)	4,045	3,298	172	7,515	8,478	18,778
Passenger Car	3,641	2,746	80	6,467	7,223	15,963
Truck and Bus	404	552	91	1,047	1,255	2,815
1956:						
Jan. (total)	3,402	4,669	131	8,203	8,979	19,517
Passenger Car	2,958	4,040	66	7,064	7,661	16,546
Truck and Bus	444	629	65	1,139	1,318	2,971
Feb. (total)	3,342	3,952	178	7,473	8,897	20,933
Passenger Car	2,919	3,387	90	6,396	7,571	17,701
Truck and Bus	424	565	88	1,077	1,326	3,232
Mar. (total)	3,466	5,034	127	8,627	9,193	21,562
Passenger Car	3,027	4,372	65	7,464	7,812	18,096
Truck and Bus	439	662	62	1,163	1,382	3,465
Apr. (total)	3,217	5,761	141	9,119	8,834	21,132
Passenger Car	2,787	4,994	67	7,847	7,530	17,649
Truck and Bus	430	767	74	1,271	1,303	3,483

Source: The Rubber Manufacturers Association, Inc.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total
1936	3,669,528	781,862	4,451,390
1937	3,915,889	892,382	4,808,271
1938	2,000,985	485,852	2,486,837
1939	2,866,796	704,308	3,571,104
1940	3,692,328	721,637	4,413,965
1941	3,744,500	875,381	4,619,681
1942	220,814	133,083	353,897
1943	0	4,501	4,501
1944	0	124,819	124,819
1945	83,792	313,643	397,435
1955:			
Jan.	635,513	89,676	725,189
Feb.	677,705	67,061	744,766
Mar.	791,280	102,992	894,272
Apr.	753,434	127,887	881,321
May	721,139	127,941	849,080
June	647,658	119,215	766,873
1956:			
Jan.	591,032	98,968	690,000
Feb.	560,924	102,384	663,308
Mar.	583,169	106,379	689,548
Apr.	552,881	101,081	653,962
May	474,010	96,114	570,124
June	.....	.....	.....

Year	Passenger Cars	Trucks	Total
1946	2,148,699	930,760	3,079,429
1947	3,558,178	1,220,634	4,778,812
1948	3,909,270	1,363,856	5,273,126
1949	5,108,841	1,123,736	6,232,577
1950	6,665,836	1,332,263	7,998,099
1951	5,337,729	1,420,432	6,758,161
1952	4,320,794	1,212,790	5,533,584
1953	6,121,787	1,202,196	7,323,983
1954	5,558,897	1,038,045	6,596,942
1955	7,920,186	1,245,018	9,165,204
July	658,736	109,589	768,325
Aug.	620,610	95,119	715,729
Sept.	467,845	91,894	559,739
Oct.	505,177	95,610	600,787
Nov.	745,993	114,448	860,441
Dec.	695,096	103,586	799,092
July	.....	.....	.....
Aug.	.....	.....	.....
Sept.	.....	.....	.....
Oct.	.....	.....	.....
Nov.	.....	.....	.....
Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.
Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
Year	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	8,059
1948	26,833	40,548	1,119	68,499	70,033	9,641
1949	31,521	31,450	887	63,858	65,114	10,657
1950	41,240	42,671	811	84,723	80,179	..
1951	32,151	32,284	1,071	65,507	67,249	10,094
1952	29,451	32,985	1,014	63,449	65,073	12,036
1953	37,957	36,072	878	74,907	74,425	11,874
1954	25,071	35,576	945	61,593	48,279	9,519
1955	5,001	33,387	1,001	39,389	35,900	6,833
1955:						
July	475	2,915	60	3,450	2,768	6,664
Aug.	394	3,269	70	3,733	2,923	5,917
Sept.	360	2,814	86	3,261	3,169	5,966
Oct.	319	2,595	89	3,004	3,119	6,286
Nov.	355	2,427	92	2,875	3,052	6,734
Dec.	305	2,289	93	2,686	2,719	6,833
1956:						
Jan.	273	3,263	71	3,608	2,917	6,294
Feb.	273	2,548	100	2,921	2,969	6,547
Mar.	281	2,557	93	2,962	3,347	6,848

Source: The Rubber Manufacturers Association, Inc.

Vinyl and Vinyl Copolymer Resins—Sales

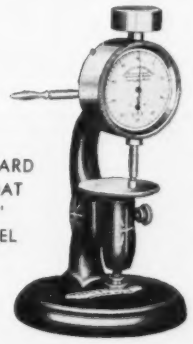
(Thousands of Pounds—Resin Content)

	Polyvinyl Chloride and Copolymer Resins						All Other Vinyl Resins		
	Film	Sheeting	Molding & Extrusion	Textile & Paper Treating	Flooring	Protective Coatings	All Other Uses	Adhesives	All Other Uses	Grand Total
1953	63,691	62,385	129,215	52,352	22,152	22,823	27,790	22,411	77,478	480,299
1954	69,943	56,588	147,284	49,546	34,890	23,676	35,148	26,609	74,090	517,773
1955	83,276	51,424	183,736	64,223	56,357	27,439	53,868	31,853	105,644	657,821
1955:										
Mar.	8,052	4,429	16,102	5,402	5,208	2,815	4,336	2,859	8,865	58,068
Apr.	8,227	4,709	15,568	5,779	5,134	2,601	3,271	2,585	8,967	56,842
May	6,985	4,429	14,452	5,240	5,109	2,449	3,547	2,809	9,237	54,256
June	7,103	3,970	14,832	5,036	4,318	2,139	4,403	2,322	8,508	52,630
July	5,925	3,765	11,943	4,304	3,601	2,027	3,540	2,605	6,919	44,631
Aug.	6,478	3,359	13,265	5,136	4,599	2,105	4,759	2,868	8,799	51,367
Sept.	6,983	4,166	15,412	5,582	4,707	2,313	4,017	3,072	9,129	55,382
Oct.	7,498	4,581	16,067	6,043	5,369	2,290	6,318	2,670	9,836	60,672
Nov.	6,855	4,771	18,224	6,271	4,945	2,147	6,818	2,945	9,831	62,807
Dec.	6,273	4,585	16,682	6,089	4,214	1,980	5,458	2,190	10,087	57,558
1956:										
Jan.	6,496	4,928	16,842	6,176	5,181	2,289	6,584	3,331	10,628	62,455
Feb.	6,849	5,296	16,509	5,187	4,894	1,792	6,185	2,718	8,696	58,126
Mar.	7,388	5,280	16,965	4,962	5,016	2,274	5,811	3,162	9,364	60,222
Apr.	6,247	4,674	15,560	4,646	4,494	2,344	7,295	3,114	11,612	59,986

Source: Chemical Division, U. S. Tariff Commission.

RANDALL & STICKNEY

THICKNESS GAUGES FOR RUBBER



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THROAT DEPTHS
1¾" to 26"
FOOT TENSIONS
supplied by Internal Spring or Direct Weights
FOOT DIAMETERS
⅛" to 1¼"
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Table and Roll or two Rolls
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AVAILABLE IN HIGH AND LOW VISCOSITIES

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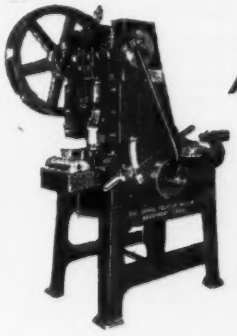
for 60 *Productive Years*



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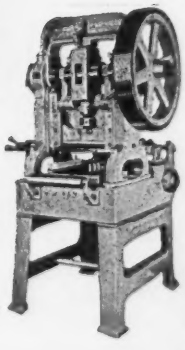
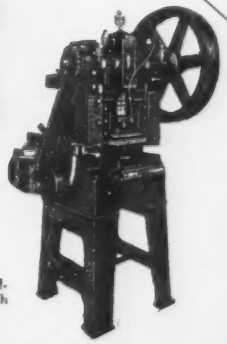
have meant quality, economy and dependability. Now, backed by this period of manufacturing know-how and service, COULTER sets the pace for another 60 years of even greater quality, economy, dependability.



MODEL A1 ▲
Precision cutting for both high-speed production or short runs.

MODEL A2 ▶
Precision cutting for multiple heels, half and full soles with stock grain.

MODEL A2s
(not illustrated)
Precision cutting across grain of stock.



MODEL A3 ▶
Precision cutting of multiple heels and taps with or across stock grain.

* *Since 1896*

COULTER — FOR CUTTING

WRITE FOR ADDITIONAL INFORMATION

the James COULTER Machine Co.
BRIDGEPORT CONNECTICUT

Various Compounding Materials Consumed by the Rubber Industry

Material	1949	1950	1951	1952	1953	1954	1955
Antimony, Primary:							
Short tons	55	103[c]	19[c]	66[c]	20[c]	49[c]	45[c]
% of total	.005	.007	.001	.004	.001	.004	.004
Asphalt:[a]							
Short tons	18,050	26,819	21,414	33,288	.....	.....	.....
% of total	0.3	0.3	0.3	0.4	.....	.....	.....
Barite (Barytes):							
Short tons	14,000	19,000	15,000	18,000	21,000	20,000	.....
% of total	2.53	3.31	2.13	2.0	2.0	2.0	.....
Carbon Black:							
Short tons	383,565	515,184	530,614	537,273	566,797	511,813	.....
% of total	93.3	92.9	93.9	93.1	94.4	.....	.....
Clay, Kaolin:							
Short tons	197,341	263,306	231,331	240,982	241,052	247,431	.....
% of total	13.1	15.0	12.7	13.2	12.8	13.2	.....
Clay, Fire & Stoneware:							
Short tons	27,148	9,500	.....	9,322	18,475	8,781	.....
% of total	0.3	0.1	.....	0.1	.2	.1	.....
Lime:							
Short tons	715	908	1,126	2,000	1,631	1,555	.....
% of total	.0002	.0002	[d]	[d]	[d]	[d]	.....
Litharge:							
Short tons	1,398	3,047	2,641	2,109	2,230	1,768	.....
% of total	1.2	1.7	1.7	1.5	1.4	1.3	.....
Lithopone:							
Short tons	3,245	4,092	3,295	1,523	1,723	1,701	.....
% of total	4.1	3.9	3.2	2.5	3.3	3.9	.....
Mica, Ground:							
Short tons	3,856	5,776	6,551	5,126	5,668	5,021	.....
% of total	7.0	8.0	9.0	7.0	7.8	6.3	.....
Sulfur:							
Short tons	59,360	75,000	75,000	75,000	80,000	.....	.....
% of total	1.3	1.3	1.4	1.4	1.4	.....	.....
Talc:[b]							
Short tons	53,400	75,900	70,970	64,476	32,137	30,621	.....
% of total	12.0	12.0	11.2	10.9	0.7	.07	.....
Zinc Oxide:							
Short tons	58,496	82,944	71,507	72,774	78,439	71,058	.....
% of total	52.5	51.6	48.4	51.2	52.7	50.7	.....

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. (c) Does not include precipitated antimony sulfide as in previous years. (d) Negligible.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	New Supply	Consumption: Tons	Consumption: % to Crude[a]	Exports	Stocks On Hand at End of Period
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007[b]	254,820	64.6	30,405	42,532
1943	304,058[c]	291,082	59.6	15,678	46,201
1944	260,631[d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.5	10,637	28,263
1950	314,008	303,733	24.1	11,740	35,708
1951	366,700	346,121	26.6	14,722	45,082
1952	274,981	280,002	22.2	11,180	30,664
1953	298,336	285,050	21.3	11,597	32,319
1954	258,101	249,049	20.2	10,232	30,746
1955	326,649	312,781	20.4	13,988	31,498
1955:					
Mar.	29,574	28,674	21.1	1,088	30,311
Apr.	26,817	26,609	21.3	1,088	30,068
May	27,911	27,652	21.2	1,056	29,528
June	30,451	29,157	21.5	1,128	29,725
July	24,114	22,563	20.6	1,176	29,939
Aug.	25,223	25,790	21.2	1,144	27,956
Sept.	26,512	26,340	20.6	1,018	27,110
Oct.	28,038	26,597	19.7	1,381	27,565
Nov.	29,124	27,229	20.3	1,313	28,473
Dec.	28,153	24,604	20.0	1,347	31,100
1956:					
Jan.	26,205	25,827	19.6	1,382	31,640
Feb.	27,108	25,571	20.3	1,115	31,875
Mar.	28,468	26,176	20.3	1,163	33,326
Apr.	26,657	23,687	19.6	....	34,215

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (a) Includes natural and synthetic rubber. (b) Includes 893 tons of imports. (c) Includes 67 tons of imports. (d) Includes 21 tons of imports.

Cotton, Rayon and Nylon Tire Fabrics

(In Thousands of Pounds)

	Production: Rayon Tire Cord Not Woven	Production: Rayon Tire Cord Woven	Production: Cotton and Nylon Cord & Fabric[a]	Production: Chafer Fabrics (all fibers)	Production: Total Tire Cord and Fabric	Stocks[b]: Cotton and Nylon Cord & Fabric	Stocks[b]: Rayon Cord and Fabric
1955:							
Jan.-Mar.	20,299	79,191	14,870	12,763	127,123	6,863	44,239
Apr.-June	21,550	81,036	18,898	12,724	134,208	8,870	40,689
July-Sept.	20,740	81,996	16,093	12,941	131,770	9,679	47,272
Oct.-Dec.	24,343	77,600	15,754	12,333	130,030	9,182	46,636
Total	86,932	319,823	65,615	50,761	523,131	34,594	178,836
1956:							
Jan.-Mar.	23,705	74,776	16,415	13,867	128,763	10,130	48,941
Apr.-June	.....	.....	.....	.....	.....	.....	.....
July-Sept.	.....	.....	.....	.....	.....	.....	.....
Oct.-Dec.	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....

Source: Bureau of the Census, U. S. Department of Commerce.
Notes: (a) Combined to avoid disclosing figures for individual companies. (b) At end of period.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1950	1951	1952	1953	1954	1955	1956
Jan.	66,981	80,670	86,863	89,634	89,852	96,397	100,642
Feb.	53,274	72,864	82,043	86,458	86,206	88,464	98,088
Mar.	78,780	86,962	87,065	98,158	101,549	105,684	.....
Apr.	80,350	87,573	98,563	102,044	103,866	111,116	.....
May	89,035	100,266	101,137	105,918	104,418	115,707	.....
June	90,174	96,364	99,305	114,703	113,037	120,710	.....
July	91,677	100,567	105,307	112,960	112,231	115,653	.....
Aug.	94,507	101,453	102,954	109,124	110,223	121,816	.....
Sept.	86,725	91,891	100,095	106,158	104,706	113,379	.....
Oct.	89,067	100,209	103,689	106,037	105,607	112,558	.....
Nov.	82,688	88,581	91,326	99,210	102,393	109,212	.....
Dec.	81,032	84,551	95,817	100,225	104,258	111,034	.....
Total	994,290	1,091,951	1,154,254	1,230,629	1,238,346	1,321,730	.....

Source: U. S. Bureau of Mines.

U. S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

Year	Balata: Tons	Balata: Value	Jelutong: Tons	Jelutong: Value	Gutta-Percha & Other Guttas: Tons	Gutta-Percha & Other Guttas: Value
1944	1,012	660,805	88	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1,515,162	541	745,418
1951	2,452	1,973,271	1,669	2,608,359	383	430,539
1952	988	762,994	1,636	2,094,983	282	385,890
1953	1,619	866,248	1,027	1,166,837	235	303,116
1954	949	504,065	2,196	2,624,926	417	511,055
1955	1,022	967,369	1,679	1,731,821	284	318,115
1955:						
June	93	61,821	119	115,511	46	50,901
July	105	66,771	146	163,189	17	16,588
Aug.	67	41,052	124	123,655	13	14,860
Sept.	151	181,535	97	105,884	10	9,295
Oct.	261	254,853	206	213,394	8	12,039
Nov.	11	94,967	97	97,981	12	21,302
Dec.	66	51,938	138	114,286	5	3,318
1956:						
Jan.	49	30,670	112	99,777	9	18,066
Feb.	68	57,727	140	137,190	11	13,642
Mar.	164	116,302	135	123,366	17	21,620

Source: U. S. Department of Commerce.

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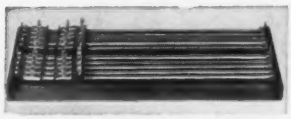

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